

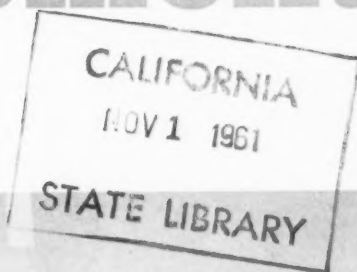
TOBER-DECEMBER 1961

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SYSTEMS Management

October-December 1961

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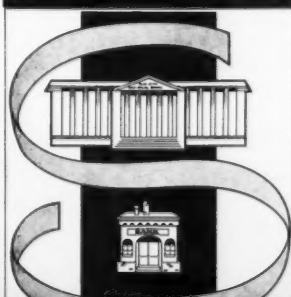
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ON THE COVER: *The executive board of M.I.R.T. ratifying affiliation with N.Y.U. See page 48.*

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EDITORIAL

We "Go" Bi-Monthly

In the parlance of publishing, SYSTEMS MANAGEMENT "is going bi-monthly." Starting with its next issue, in January, SM will appear every other month.

This increase in frequency has been dictated by the needs of the dynamic field we serve. So much is happening so fast in the world of systems that the demand from us for information — and more information — has been overwhelming — and flattering.

We knew that there was a need for a publication such as this one when we started it. But, quite frankly, we never realized how acute that need was until the avalanche of mail began to pour over our desks from every corner of the United States.

As we embark on this new period in the life of SYSTEMS MANAGEMENT, we want to say "many thanks to you" for your positive response to our magazine, for your continuing enthusiasm and — yes — even for your criticisms. Especially for your criticisms! That you have thought enough of what we are trying to do to try to help us do it better is the most encouraging of responses. And by taking action on your critiques, we think that we have been able to continually refine our magazine so that it is ever better able to justify your interest and support.

Our frequency changes but not our dedication to the systems field. We will continue to spread the gospel of systems with the same fervor that we have shown in the past. We will continue to respond to your comments, your suggestions, your questions, your needs and your constructive criticisms. So keep sending them.

Industry News

● Our belief in and promotion of EDP-microfilm systems has been followed by participation at General Electric's request. Its Information Systems Operation plans to demonstrate some storage and retrieval techniques and will use SYSTEMS MANAGEMENT's article on "Visualizing Management Reports" (Jan. 1961) as one of its selections. The selected articles and abstracts will be computer-stored, retrieved, microfilmed and printed out for demonstration.

● The National Machine Accounting Association elected Alfonso G. Pia, as its International President, and Elmer F. Judge, as International Vice-President for 1961-1962, at its 10th Conference, held in Toronto. The 1962 National Conference will be held in New York City. Other newly elected officers include William A. Bates, International President for 1961-1962, Systems and Procedures Association; Albert B. Bossen, Connecticut Life Insurance Company, President, RCA 501 Users Association.

● Burroughs Corporation has opened the country's first permanent consultation center for the financial industry's new electronic language, MICR. Located in Chicago, the center houses equipment — including an EDP system — developed especially for the MICR program.

● The recently initiated National Driver Register Service is using EDP equipment to handle records and inquiries. Established by Congress, the Service will keep a file on motor-vehicle operators who have lost their licenses for driving when intoxicated or those convicted of a violation involving a traffic fatality. States' participation is voluntary, and data supplied by them will be accepted by the Service in manually prepared forms, punched cards, punched and magnetic tape.

● Stock quotations from the New York, American and Midwest Exchanges and the N.Y. Bond Exchange will be transmitted cross-country within 15 seconds after the close of the stock ticker by the Associated Press, when its EDP system is installed next year. Operating in AP's New York news office, the IBM-designed equipment will automatically link stock tickers, through the computer, to tape-operated typesetting machines at newspapers all over the country, thus providing updated stock data to its members.



AP editor Nate Polowetzky, left, and IBM V. P. McLain B. Smith inspect 1620 console.

● The half-billionth Post-Tronic bank ledger form, part of an order for the First Edina National Bank, Minneapolis, Minn., was recently produced by the National Cash Register Company. The form is a combination depositor's statement and bank record with a built-in magnetic memory. Also on the banking front, centralized accounting, check sorting and handling operations required by the Manufacturers Trust Company's (New York) 467,000 regular and special checking accounts will soon begin with the installation of IBM 7070 and 1412/1401 systems. Transfer of all checking accounts in the bank's 122 NYC offices may require more than a year. When the accounts have been transferred to the computer, all changes in balances will be made on a daily basis, thus providing both customers and bank officials with up-to-date information at all times.

● An "In-Industry Scholarship" to study the application of analog computer techniques in medicine has been awarded by the Foundation for Instrumentation Education Research to Dr. Lee D. Cady, Jr., Asst. Professor, N.Y.U. Medical Center.

Calendar of Conferences

National Institute of Governmental Purchasing, 16th Annual Conference. Commodore Hotel, New York, Oct. 8-11.

Systems & Procedures Assn. of America, International Systems Meeting. Statler-Hilton and Pick-Carter Hotels, Cleveland, Ohio, Oct. 8-11.

Philco Computer seminars. Philco Computer Center, Willow Grove, Pa., Oct. 10, 24; Nov. 2, 21; Dec. 5, 19.

American Society for Quality Control. 16th Midwest Conference. Chase-Park Plaza Hotel, St. Louis, Oct. 19-20.

National Business Forms Associ-

ates Conference. American Hotel, Bal Harbour, Fla., Oct. 23-26.

National Business Show. Coliseum, New York, Oct. 23-27.

Honeywell 800 Users' Association, 2nd meeting. Houston, Texas, Oct. 26-27.

Industrial Management Society's 25th Anniversary Industrial Engineering and Management Clinic. Pick-Congress, Chicago, Nov. 1-3.

Society of Reproduction Engineers, Visual Communications Congress. Biltmore Hotel, Los Angeles, Dec. 2-5.

1961 Eastern Joint Computer Conference. Sheraton-Park Hotel, Washington, D. C., Dec. 12-14.

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For more information visit our Booth at Visual Communications Congress, Los Angeles, or write our Sales Department.

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New Equipment Review

For more information without obligation circle same number on Reader's Inquiry Card.



Tape-Card Duplicator 101

Verification of tapes and duplication of tapes and edge cards is accomplished by a Tape Comparator System introduced by Friden Inc. Greater ease and reliability is claimed in duplicating and comparing 5-, 6-, 7- or 8-bit codes for use primarily in computer and numerical systems applications. A variety of equipment combinations is also available. Combined with Regeneration Systems, it allows simultaneous tape duplication.



Electric Typewriter 102

Conventional type bars have been eliminated in the new IBM Selectric typewriter recently introduced. Heart of the machine is a truncated sphere measuring $1\frac{3}{8}$ " in diameter which contains 88 characters. No moving carriage is required since the sphere travels along the paper. Other features include cartridge ribbon change and visual margin and tabulating controls.



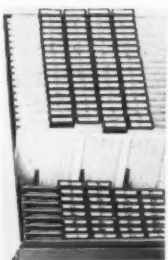
Automatic Copier 103

Full-size ($8\frac{1}{2} \times 11$) positive copies can be made directly from opaque microcopy with the Microcard Copier available from Microcard Reader Corp. The unit employs the diffusion transfer system to produce copies automatically in 30 seconds at 11¢ each. The lens magnification is 17x. Maintenance and repair is simplified by modular construction. Operation is 120/240 volt AC.



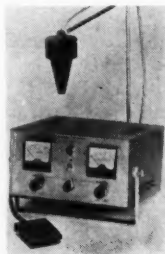
Perforated Tape Integrator 104

An easy-to-operate modular Data Integrator that produces a common language perforated tape for automatic business machines, tabulators and computers which sequentially combines fixed and variable data, identification and time-count data is now available from American Data Machines Inc. The unit can be used with any standard DP equipment and accepts all punch cards.



Vertical File 105

Visible, vertical filing of punch cards is provided by the DFC/VFC system announced by Vue-Fax System Controls Corp. The system is comprised of a series of cabinets which hold from 10,000 cards up. Lucite bearings provide automatic spacing at the top of the file and movable index tabs angled for full visibility permit easy expansion and contraction of the file. An aluminum spacing panel assures maximum filing capacity and prevents sag.



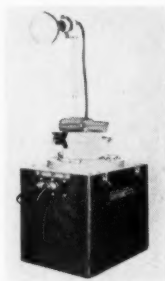
Microfilming Light Meter 106

Microdealers Inc. is marketing the Metron Automatic Light Control designed to insure microfilm negatives of even background density regardless of the material being filmed. A foot pedal automatically swings the photocell into the field where a reading is made and is returned when pressed again. The reading is locked into the circuit so the drawing may be centered. The cycle is completed in ten seconds.



Punch Card Computer 107

A completely integrated, moderately priced system designed for the punch card market has been launched by the Burroughs Corp. The B200 series features a variety of units including a card puncher which operates at a speed of 300 cards per minute. Internal buffering helps to balance out the speed disparities between electronic and electro-mechanical components.



I-D Camera 108

Identification badges and pass cards can be produced immediately with the Foto-Sure camera from Natural Lighting Corp. The self-contained unit combines a photo of a printed form with a picture of the applicant superimposed in the appropriate place. Exposures are made on standard Polaroid films which require only ten-second development. Total weight of the unit is $25\frac{1}{4}$ lbs.



Portable Microfilm Camera 109

Portability is combined with high resolution in the Model FA-1 Field Agent camera available from the Frederic Luther Co. The 16mm planetary camera features variable and metered light control from matched sets of four 20-watt lamps and automatically signaled shutter cycle and film end indicators. Weight is only 45 lbs. and copy size is up to $10\frac{1}{2} \times 15$ ".

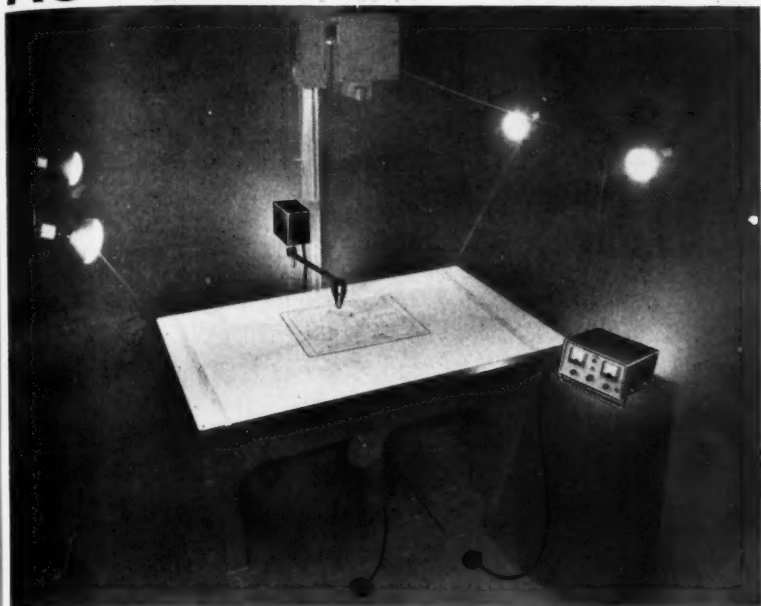


General Purpose Computer 110

A solid-state modular computer designed for the medium-sized market has been introduced by Computer Controls Co., Inc. The DDP-19 is claimed to be the first medium size computer capable of handling real time simulation, high speed target precision tracking and real time cost data acquisition. Basic input is high speed paper tape to 1000 characters per second.

continued on page 44

MICRODEALERS INTRODUCES AN ENTIRELY NEW SYSTEM OF AUTOMATIC LIGHT CONTROL



AUTOMATIC LIGHT CONTROL SIMPLIFIES OPERATION

Because it is fully automatic, the new unit requires less skill and judgement of the operator.

HOW IT OPERATES

1. The operator simply depresses the foot switch, and the Photocell Arm automatically swings forward into the photographic area; an open area of the material (the true background) is then placed beneath the photocell which reads only a small section of the drawing.
2. The operator depresses the switch again, and: A) the arm swings back to normal out of the photographic plane, and B) the proper reading is locked into the circuit so that the operator can center the drawing beneath the camera. Now by depressing the camera switch, the cycle is completed. Under normal conditions, this complete cycle requires about ten seconds.

HOLDS READING 5 MINS.

The locking circuit in the control unit will hold the same light intensity up to five minutes so that additional exposures of the same material may be made if required. Otherwise, by depressing the control switch again, the cell is free to read the next material, and the operation continues.

NEW EQUIPMENT INSURES EVEN DENSITY NEGATIVES

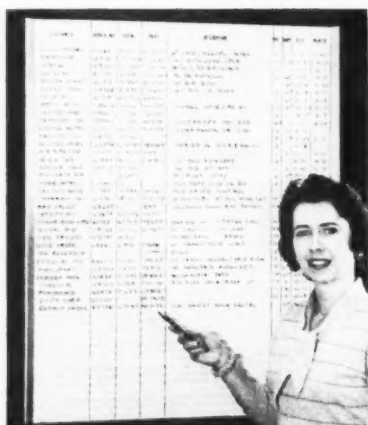
SPEEDS UP MICROFILMING

In cooperation with Metron Instrument Company, Microdealers, Inc. has developed a system for automatically controlling the light level when microfilming engineering drawings. The new unit is designed to take the guess-work out of density control by automatically adjusting the light level, thereby maintaining even density negatives regardless of the material being microfilmed. Numerous tests on government specification work have produced results well within specification tolerances. The tests also indicate a speed-up in production two to three times that previously obtained on specification work.

The compact new equipment consists of a photocell and arm, foot switch and light control unit. It operates on normal 115-V power and can be adapted to any standard lighting set-up. It eliminates time consuming manual voltage regulation — "test strips" and the need for reflective meter readings. Ask your nearest Microdealer for a demonstration with a special test kit that will show you how *Automatic Light Control* can increase efficiency and speed up production.

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Information Management

by HERMAN LIMBERG

Director of Management Reporting

Office of the City Administrator, New York, N.Y.



Reporting By Exception

In past issues this column has emphasized the following factors as the essentials of an effective management information system:

a) *Specific measurable objectives established, in the first instance, by top management and, subsequently down the line, for each level of organization.*

b) *Yardsticks (or measurement criteria) which define "what management needs to know" within the context of the objectives.*

c) *A system which will provide, efficiently and economically, the management information required at each level.*

It has been pointed out, too, that an effective management information system will stem the upward flow of data which, all too frequently, burdens executives and managers with reports that either exceed or do not fulfill their information needs. As operational data are processed they should be refined and screened for conversion into management information to be transmitted upward to the next level of organization for the purposes of planning, evaluation and control. In the refinement and screening of data, a certain amount of detail should be extracted from the input to produce the information output required for the next higher level.

Thus, as information flows from the first line of supervision to top management, the amount of detail reported will be sharply reduced to meet the needs of each echelon in the pyramid or hierarchy. It is important to observe, too, that as the volume of detail decreases, the scope of planning, evaluation and control becomes wider.

The refinement and screening of

information to delete details not required in reports to higher management entail the application of the *exception principle*.

The following citations from some of the authoritative sources may be helpful:

1. "Managerial efficiency is greatly increased by concentrating managerial attention solely upon those executive matters which are variations from routine, plan, or standard." *Cost and Production Handbook* by Alford (p. 148) Ronald Press, (1934).

2. "It should be recognized that a system cannot be made infallible nor can it be constructed in a way that will properly serve all the needs that may arise. An administrator should realize that all rules and regulations comprising a system must be interpreted in consideration of the circumstances of a particular case. Exceptions may be expected to arise. They should be looked for rather than shunned. In fact, systems are established in order that the administrator may have time to deal with exceptions. This is frequently referred to as the 'exception principle.'" *Industrial Organization & Management*, Bethel, Smith, Atwater and Stackman (p. 129-130), McGraw-Hill (1950).

3. "A limitation of any statement of policy is that it cannot provide for all contingencies. A subordinate who is confronted with a situation which was not anticipated by the policy statement and which is beyond the scope of his authority to decide should refer the problem to his superior for decision. The problem may be referred to still higher levels until it reaches an executive who has authority to establish a policy for handling it. Once the decision is made and transmitted to the person who puts it into effect, a guiding principle is established for dealing with similar situations in the future. This method of dealing with new problems is called

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EDP in Action

Automatic Control's Greatest Era

by GEORGE M. MUSCHAMP

Few companies today operate without some means of market forecasting. These predictions are the inputs to the production control mechanism. The production control mechanism goes on to provide parts breakdowns which form the demands on the manufacturing departments. Cost information is generated and related to prices — an operation that can be mechanized in a varying degree. Compilation of salary and wage and other information may be done automatically, including various "control" reports.

Anything which purports to be a "control" must contain performance versus a criterion. If it has these characteristics, it has the elements necessary for automatic control. For example, if a product is to yield X per cent gross profit, and the automatic data processing equipment determines that a given product line is not meeting that target, presto! A switch shuts down that line. Ridiculous? This is now actually being attempted.

A "profit switch"

Suppose that you have a continuous refinery under full automatic control and capable of turning out two different products from the same crude input. The adjustment of the automatic control system determines which product will be produced. Suppose, also, that these control system adjustments can be regulated automatically by a computer which, in effect, possesses a "profit switch." Suppose, further, that the market situation makes the two products equally acceptable. Then the "profit switch" in the computer could automatically set the refinery control system to make the profitable as opposed to the unprofitable product.

The significant factor of such operations is that market and economic information processed in computers is directly applied to the

automatic control system of the plant.

This wedding of plant and office operations will not always be as simple as the "profit switch" but will consist of a multiplicity of such operations automatically programmed and monitored by people as they properly should be. Some systems are complex but can be built step-by-step such as the one to be used by a large metropolitan electric company. This company will use an on-line digital computer to make sure that electricity is produced at minimum cost.

One possible solution

A generating station has a control system that keeps the characteristics of each generator's output constant by varying the supply of steam or hydraulic power to the turbine. Since generators have different efficiencies, the load should be apportioned among them according to their relative efficiencies at different levels of load. Stations will also vary in overall efficiency and may be miles apart, introducing line loss factors. The complex relationship of factors is such that a general-purpose digital on-line computer offers the best solution to the economic dispatch formulae and the automatic adjustment of the network, station and machine control systems to maintain peak overall system efficiency.

Another complication occurs

when one company buys or sells power from another as demand dictates. This introduces variables of inter-company economics, accounting of the power produced by one company and used by another.

The computer, obtaining basic data for intercompany billing of the delivered power, brings together in a fully automatic way what have been regarded as separate plant and office operations.

ing, the communication function is becoming increasingly important. In the power control system just described, there must be adequate communications between the various measuring and control points and the central control locations. This is handled by telephone lines. In the operation of pipelines, both telemetering and remote supervisory control systems are so advanced that many large stations are completely unattended.

Where telephone or telegraph wires cannot be used, as is the case with airborne and other vehicular systems, radio will have an important place. Now that the Federal Communications Commission has opened frequency bands above 10,000 megacycles for private communication systems, industrial firms can have their own networks for data links, automatic control, and voice. All of this communication activity will accelerate the joining of office and plant systems. □

George Muschamp, a vice president-engineering for the Industrial Products Group of Minneapolis-Honeywell Regulator Co., has spent more than 30 years in the data processing and instrumentation industry. This column is based on a talk he prepared for the 5th Conference on Manufacturing Automation recently held at Purdue University.



Microfilm Topics

by HUBBARD W. BALLOU
Columbia University Libraries



Micro-Semantics

Every craft and profession sooner or later develops a special vocabulary or jargon that makes it easier for its members to communicate with each other. When a profession has resulted from the overlapping of separate disciplines, this can result in words having double meanings. Microfilm is an offshoot of photography, itself deriving from physics and chemistry plus a leavening of art. As it developed, it absorbed techniques and expressions and has now built up a jargon that is always confusing and often intimidating to the newcomer.

Last spring I had a student who was more perplexed than usual by some of the similar trade names that have appeared in the microfilm industry. As a result I started a collection of micro-words, which now consists of about seventy terms. To smoke out the missing terms, I am appending the list here for the reader's interest if not edification:

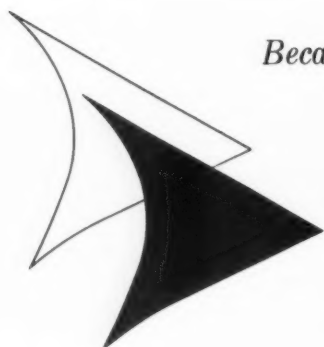
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Micron
Micro-Notch
micro-opaque
micropaper
Microplat
Microplex
micropoints
Microprint
Microreader
Micro Record
microreproduction
microrecording
Micro-Scanner
Microscheda
Microseal
microsheet
Microskaner
Microstat
Microstrip
Microstyle
Microtak
Microtape
Microtext
Microtheque
micro-transparency
Microtronic
Microtwin
Microverter
Microvist
Micro X-Ray
Mikrocitac
Mikrokopie

* — Two applications of the same term

One of the most glaring examples of tangled terms is that of the Microprint® — Microcard® mixup. Both of these terms are registered trade names for specific products. Both of them are examples of microforms printed on paper sheets. The Li-



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Available on back-coated clear safety base in 35mm width
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Circle No. 503 on Post Card

brary of Congress added to the previously existing confusion by using the term microprint to cover all varieties of the genus. Eastman Kodak compounded the error by publishing a pamphlet entitled: *Microprint—Where it Stands*, which listed sources for some of the opaque microforms, but neglected to note the Readex Microprint Corporation. Fremont Rider, the father of the Microcard®, made a heroic effort in 1951 to untangle the snarl by coining the term "micropaper" to cover all types of opaque microtexts. I have done my best to further this crusade by using this term in print whenever possible. It appears to be a losing battle, however, as the forces supporting the noxious "micro-opaque" increase. I cannot see the general public substituting "micro-transparency" for "microfilm". Why should they be made to use "micro-opaque" rather than the simpler "micropaper"?

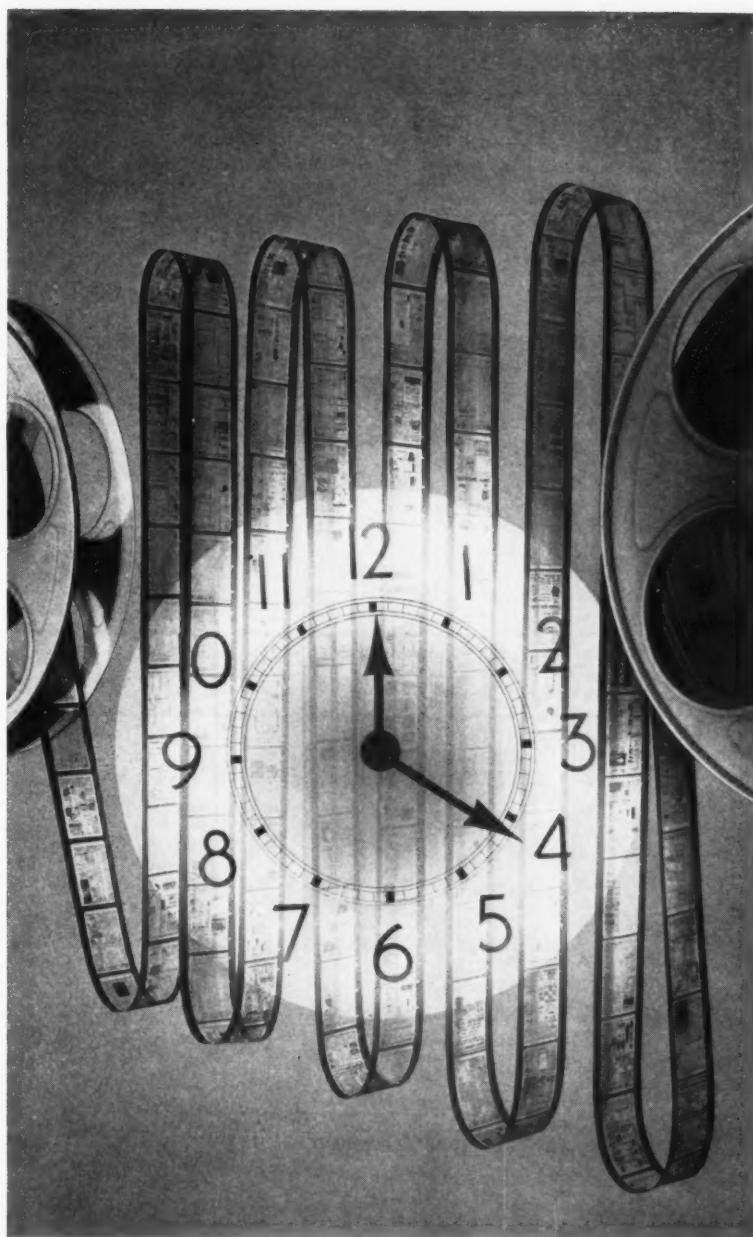
Standardizing Terms

What is being done to unsnarl the language of microfilming? In 1955 the National Microfilm Association published Hendrix Ten Eyck's *Glossary of Terms Used in Microreproduction*. This 88-page booklet culled terms of especial interest to microfilm producers and users from many sources of photographic words.

In 1959 the U. S. Army Signal Equipment Support Agency at Fort Monmouth published a preliminary draft of a *Military Handbook Glossary of Photographic Terms (Including Reproduction)*, incorporating material found in about 40 established sources. Criticism was requested and received from individuals and societies in the photography and reproduction fields. The finished handbook is expected to be available from the office of the Superintendent of Documents in the near future.

A reading of the American Standards Association's sectional committee PH5 minutes (devoted to photographic reproduction of documents) will yield many references to glossaries. When ASA feels that the job can be done better by other

continued on page 43



JUST 21 MINUTES to process your own microfilm automatically. Microfilmed documents are ready for viewing just 21 minutes after the exposed film is loaded in your Houston Fearless Labmaster for processing. (200 ft of 16mm @ 40 f.p.m.) This fully-automatic machine will process thousands of documents per hour, each one of top archival quality. Besides, it offers greater convenience, higher security for confidential papers and substantial savings in processing costs. A compact, completely self-contained unit, the Labmaster may be installed in a lighted room and easily operated by almost anyone. Reasonably priced. 16mm and 16/35mm models. Send today for brochure and prices. Westwood Division **HF** Houston Fearless Corp., Los Angeles 64, Calif.

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- Finger-tip viewing and print-out from seated position.
- Valuable versatility—trimmed prints from 8½" x 11" to 18" x 24" with no wasted paper.
- Unexcelled viewing and printing fidelity from aperture cards, jacketized film.

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See it at the Visual Communications Congress in Los Angeles—Photostat Booths #164-165.

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Dealer Inquiries Invited—Write



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Mechanized document storage and information retrieval systems hold the same position today that computers had ten to twelve years ago. During the last ten years, and particularly within the last two or three, new tools and techniques to mechanize document storage and retrieval have evoked an increasing interest. Punched card equipment, computers, and microfilm systems are now being applied at an accelerated pace to information and document retrieval applications.

Edge-punched cards. The last ten years have seen a tremendous increase in the use of edge-punched cards. Compilation of indexes, bibliographies, charge systems and information files still form only a limited market for

Data Retrieval's Rosy Future

by ROBERT A. SHIFF, *President, Naremc Services, Inc.*

these cards. Further development work in this area — such as mounting film clips and xerographic microprints to edge-punched cards — can be anticipated.

Punched Cards and Tabulating Equipment. These media have reached the point of standard equipment capable of carrying out routine accounting tasks with the added flexibility of retrieving, reproducing and disseminating information. However, the use of digital data processing equipment for the sole purpose of information retrieval is limited unless the information stored is called upon with a high degree of frequency. Several new units developed by IBM are worthy of note: IBM-9900 Special Index Analyzer (a commercial modification of the COMAC, which was developed by Documentation, Inc. under U. S. Air Force sponsorship.), IBM-9310 Universal Card Scanner and the IBM-101 with row-by-row scanning attachment (a modification to the existing IBM-101 Statistical Sorter.).

A Prediction of Things to Come

Use of punch card equipment for the preparation of directories, catalogs and other forms of printouts, represents applications which will become a great deal more common in the years to come.

Computer Equipment. Many existing computer systems have been programmed for storage and retrieval applications — but these represent only a small fraction of the total workload. With the exception of a few complex programs for working with patents and chemical compounds, the programs have usually represented some form of coordinate indexing. In addition, for file searching, the computers have also been used for the generation of conventional catalogs and indexes to be used in manual systems; the automatic routing or disseminating of material to potentially interested persons; the preparation of abstracts from straight textual mate-

rial; the generation of lists of key index words; and the generation of permutation or key word-in indexes.

Magnetic Media. Magnetic tape and card systems developed for file searching include:

Logic Processor (Aeronautics), Index Searcher (Computer Control Co., Inc.), Univac Tape Searchwriter (Remington Rand), Findafact (Rese Engineering Co.), GE-250 Information Searching Selector (General Electric Co.), Magnacard (Magnavox Co.) and Tape Searcher (Herner & Co.).

Only one or two developmental models of each of these units have been produced thus far, and none of them is completely operational yet in a documentation system.

Image Storage Systems.

Development of mechanized image storage and retrieval systems will continue to be one of the greatest areas of activity. To date, the Film-arex and Minicard equipment are the only systems which can be considered completely operational — and these are only being

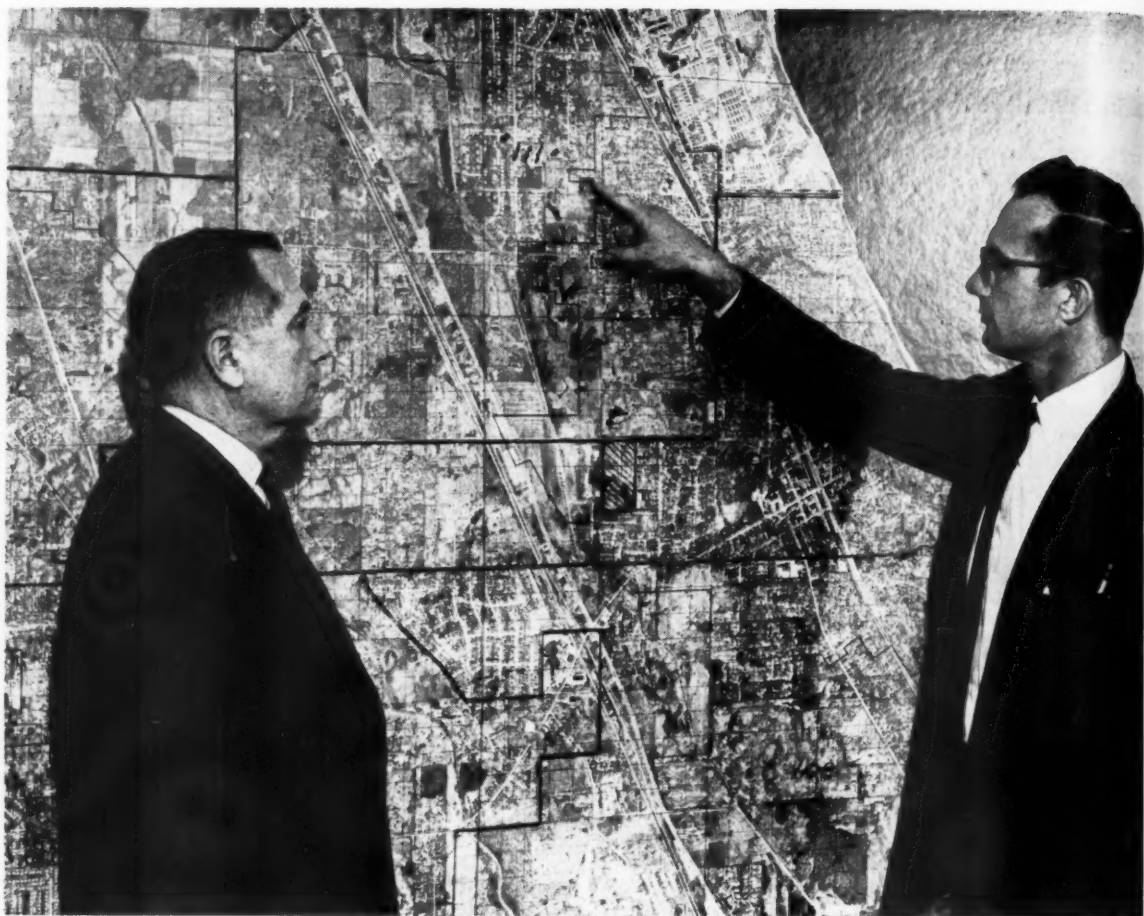
used by government activities. Still under development are such systems as:

Rapid Selector (National Bureau of Standards), Finder-Reader System (Massachusetts Institute of Technology), Walnut (IBM), Film Searcher (Rabinow Engineering Co., Inc.), Verac 903 (AUCO Corp.), Filesearch (FMA, Inc.), Itecard (Itek Corp.), Magnacard with image (Magnavox Co.), Film Searcher (Magnavox Co.), Telecard (General Precision Laboratories, Inc.) and Rapid Access Look-Up System (Ferranti-Packard).

Thus far, cost factors have been quite high to the point of discouraging potential users. Unit-record microfilm systems in such forms as the microfilm aperture card, continuous image card, and micro-opaque cards have the greatest potential for expanded use. The use of aperture cards, particularly to meet Department of Defense specifications, are now receiving wide use. With this use have come important improvements in microfilm viewers, copiers and printers.

Character-recognition equipment. There are now at least 150 machines developed to read characters and entire pages — to read one line of characters at a time (bank checks, charge slips, etc.) and entire pages of typewritten text (as input to data processing systems). The immediate challenge is to design forms and paperwork with a built-in compatibility for processing by character-sensing equipment.

Based on current knowledge and experience, it appears that the future of data retrieval is bright. *continued on page 37*



EARLING ZAESKE (R) and A. E. Wolters study photo map of Highland Park which will help them predict town's future educational needs.

A Way to Total Up The School Kid Boom

A winning duo of punch cards plus aerial photo maps helps Highland Park, Ill. plan for future school requirements.

by FRANCIS J. PARDO
Associate Editor

Population growth normally creates problems for a community. Not the least is the educational facility shortage.

To satisfy its citizens, a community must have enough classrooms for their children. This means anticipating population growth and planning school construction accordingly.

Faced with this problem, the Board of Education of Township High School District #113, Highland Park, Illinois, installed a punch card system to keep a perpetual record of all persons from ages 1 day to 21 years in its district. Thus it satisfied not only its own information requirements but public school census requirements of Illinois State laws.

These laws require a bi-annual census to be taken of all persons 1 day to 21 years old. If, however, a

perpetual record is maintained on such persons, a personal canvass of the district is not required.

Tied in with the card system is a recent aerial photo survey of the district. Originated by E. W. Zaeska, District Operation Manager, this has assisted the school board in determining potential school building locations, revising districts and deciding on school bus service eligibility of students. Eligibility is limited to persons living within 1½ miles from school by the customary route of travel.

Devised by John Babillus, President, Data Systems Corp., Cedar Rapids, Ia., in 1958, the card system consists of a telephone census with work cards being filled out for each person including name, address, date of birth, and sex. After screening for errors and additional coding data, the cards are sent to a tabulating service center.

At the center, the information is transferred to punched record cards. The record cards are retained by the center and used to prepare census reports required by the state and also for Board use in formulating future plans.

The work cards are then sorted in alphabetical sequence and returned to the District Administration office for reference and to make further changes.

Constant population changes must be recorded to maintain the cards at 'current status'. Such changes as new births, move-ins, move-outs, moves within the district, and transfers between schools are obtained from the Registrar of Births, the Chamber of Commerce, public utilities, and the various district schools.

When a person has moved out of the district, the work card is stamped "REMOVE" and mailed to the center where both cards are destroyed.

Work cards are made for additional persons, such as new births and move-ins. Duplicate cards are forwarded to the center and new record cards punched and filed. Changes to existing cards are made by punching new ones and mechanically substituting them.

In addition, each year all cards are up-graded one grade and appropriate transfers between elemen-

tary schools and high schools are made automatically by the center. Cards of persons reaching 21 are automatically removed from the files.

With the rapid expansion of the area, the Board decided that available maps were not adequate sources of information. Arrangements were then made with Chicago Aerial Survey of Barrington, Ill. to photograph the area and make a large photo-map or mosaic. They then developed a 0.1 mile grid system for the district and superimposed it on the mosaic.

For the selection of school sites, the district combines the aerial photo information with punched card data. In this way clear areas of land are readily visible and population grouping readily obtainable from punched cards.

If necessary, any desired segment of the student population or potential population can be transferred to the photo so that officials can visually observe where population concentrations are, and where a school site should be located to best serve the population.

In the past, many questions were never answered because of the immense amount of work involved in collecting the required data on a 'one-shot' basis. With this system the entire population of this age group is constantly on file at current status and can serve many purposes not only for the school district, but for the community as a whole. □



ECONOMIC GEOGRAPHY section of Chicago Aerial Survey reduced data from photos to practical information for school board planning.

ONE SET of punch cards is maintained at Highland Park school offices (below). Duplicate set is at tabulating service center.





Library Scores With Motto Of Better Service

Contra Costa expedites charge-outs with microfilm and punch cards and simultaneously cuts down on both costs and staff.

Giving better service to the public is the end goal of government agencies on all levels. The Contra Costa County (Calif.) library system, which includes 17 branches, two bookmobiles and eight deposit stations, is achieving this goal through a microfilm and punched card system of charging out books.

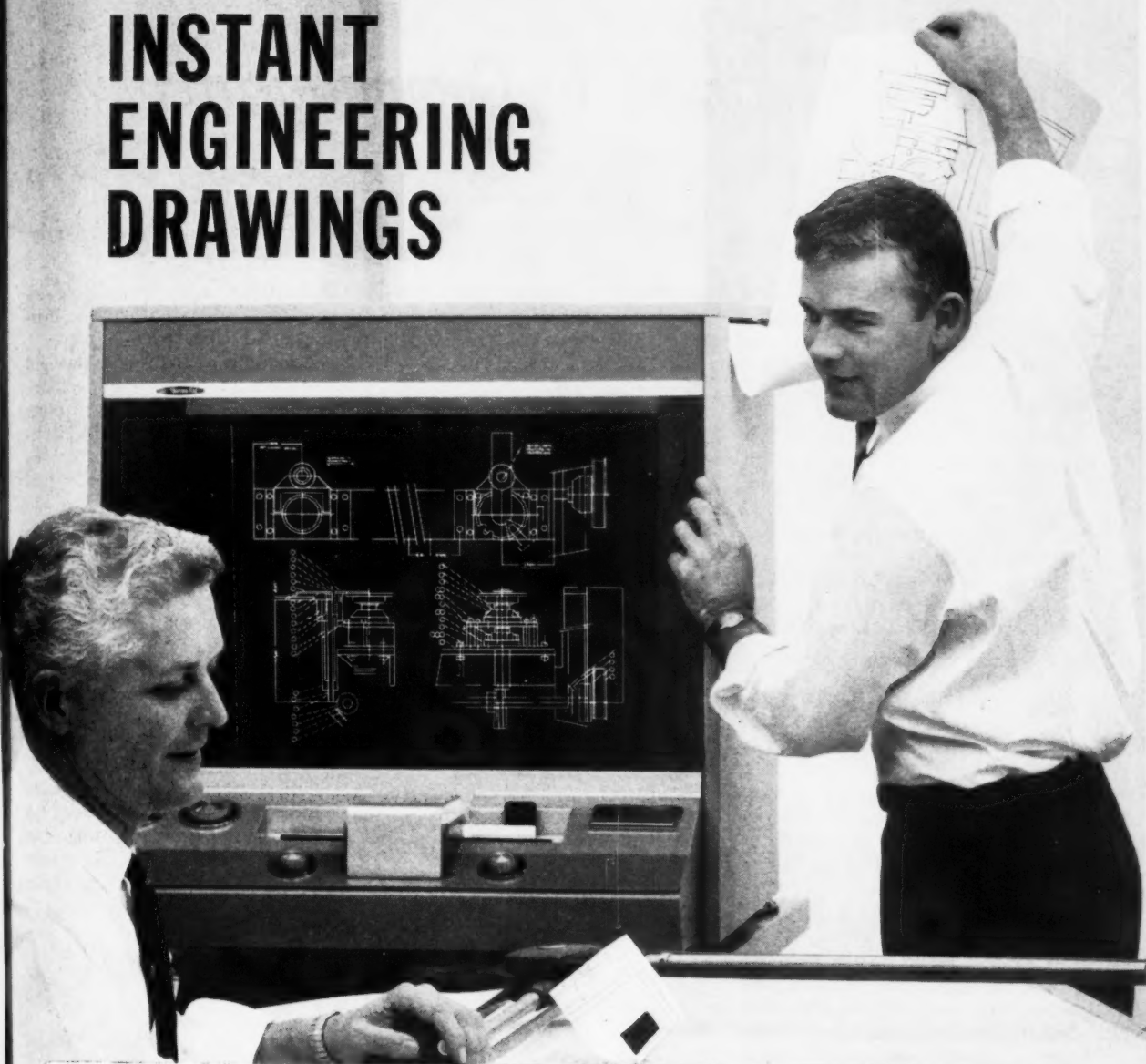
The microfilm charge-out system offers three major advantages to Contra Costa over manual charge outs. It virtually eliminates errors, cuts costs and speeds operations. This is accomplished with the aid of eight Recordak portable microfilmers and four Recordak 310 readers.

At each camera location, the time of at least one full-time library clerk has been saved. Even when the half-time services of a clerk at Central Circulation who pre-dates and sorts punch cards are added, the net result is a saving of at least one-half clerk per camera.

Microfilm cameras are installed at all branch libraries which have or anticipate a circulation of at least 100,000 a year and in the bookmobiles. The camera is placed at the main control desk. When a patron brings books to be charged out he or she presents an identification card along with the books. The clerk takes the book card from the book, picks up a pre-dated, pre-numbered, punched transaction card and puts all three through the microfilmer. This simultaneously records the pertinent information — name of borrower, address, title of book, and date due. The book card and transaction card are then

continued on page 47

INSTANT ENGINEERING DRAWINGS



FASTER PRINTS MEAN FASTER PRODUCT DEVELOPMENT, FASTER PRODUCTION. Imagine locating a drawing or record in seconds. Imagine having a work-size print in just 8 seconds. All this, and more, can happen when your drawings and records are on microfilm . . . with FILMSORT® Aperture Cards and THERMO-FAX "Filmac" Reader-Printers. This is the way many companies are saving valuable engineering and drafting time, saving the cost of full-size print preparation, saving space, and saving print distribution costs. The cost? Far less than you would expect for such amazing efficiency. Find out now how you, too, can put microfilm to work—get Instant Engineering Drawings when you need them, where you need them—with 3M Microfilm Products.

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Circle No. 518 on Post Card

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Please send me information about Instant Engineering Drawings.

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New Horizons In Communications

by ROBERT F. LANDRY
Assistant Vice-President
American Telephone & Telegraph Co.

The development by AT & T of a practical system for transmitting data over the existing telephone network is one of the most significant and far-reaching accomplishments of the computer age. This service, Data-Phone, enables business machines to talk with each other in much the same way that humans do. It also permits business machines to transmit handwriting, printing and diagrams instantly to and from any place in the United States and Canada where there is telephone service.

In a typical installation, data sets are placed between the business machine and the telephone line at both the sending and receiving locations. Connections are put through as ordinary telephone calls and billed at the same rate. Data in any machine language is then transmitted from one machine to another with the flip of a switch at speeds currently ranging up to the equivalent of 1,600 words per minute.

Data sets receive information in the form of electrical pulses or bits from the originating machine and convert the pulses to tones suitable for transmission over ordinary telephone circuits. At the receiving end, similar sets convert these tones back to electrical pulses which feed into business machines to reproduce data on punched cards, paper or magnetic tape or in handwriting.

Here are a handful of the many different kinds of present-day applications of Data-Phone service and business machine teamwork:

A manufacturing company needed computer service at each of its plants, yet the amount of time the machine would be in use could not justify the cost. The solution was a central computer and Data-Phone service. Now, each plant sends its information via Data-Phone service to the computer according to a

schedule. The company gets maximum utilization of the single computer which can be used daily by all plants.

A leading airline wanted a faster and more accurate method of handling reservations and determining the existence of available space. The solution again was a central computer that reservation agents could query by means of Data-Phone. As the question is asked: "What space is available?" the central computer instantly taps its stored memory and provides the answer.

They Bank On It

In another case, a bank wanted a faster way to obtain daily payment information from its six branches. Data-Phone service again provided the answer. The bank installed business machines at teller counters to record all transactions on eight-channel paper tape. During the day, the tellers transmit data to the bank's main office via Data-Phone service.

Information is now available instantly at less cost than the messenger service previously used.

Because it has become a standard procedure in many airline offices, you may be familiar with another Data-Phone application called Teleticketing. Many companies want to obtain airline tickets for their personnel quickly and without having to call in person for the tickets. By using the Teleticketing system, an airline ticket office agent connects the teletypewriter to the telephone line and inserts a tape containing the ticket details which are transmitted to a receiving machine in the customer's office, where the ticket is printed on the standard form by a teletypewriter.

Currently, there are about 1300 Data-Phone data sets in operation across the country. We foresee the day when there will be some form of data transmission device connected with literally millions of the

continued on page 38

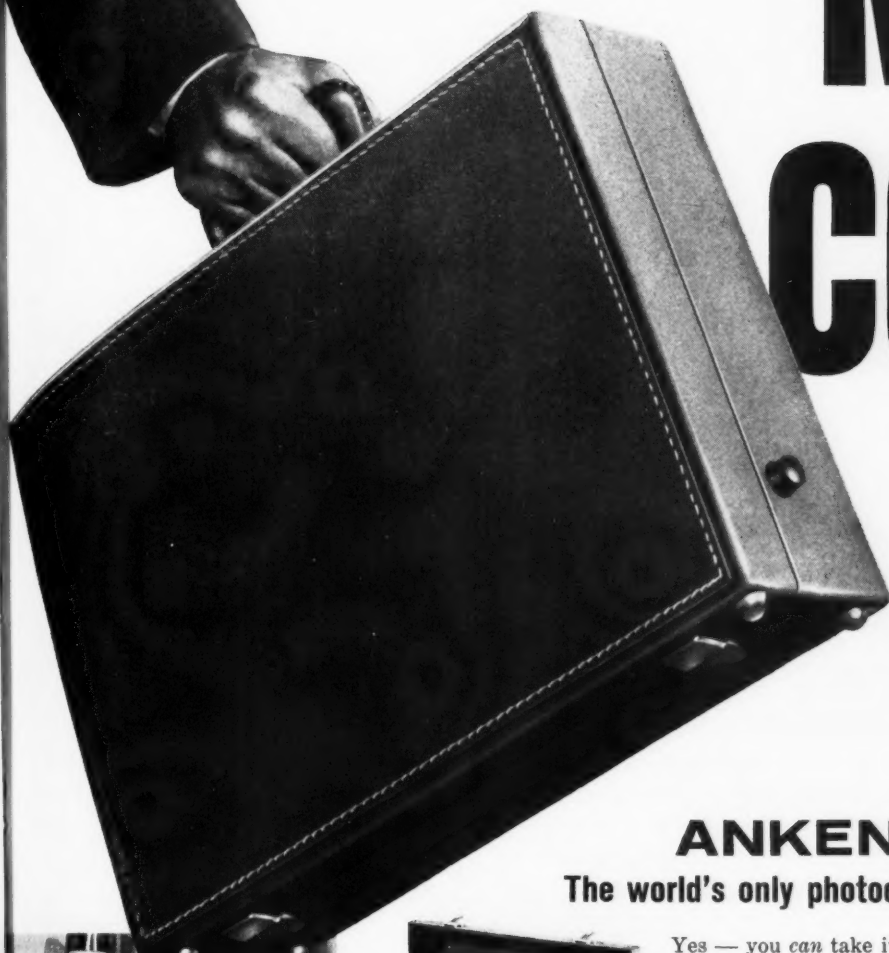


EQUIPMENT SHOWN HERE permits high speed transmission of "machine talk" information over regular telephone lines. It uses the same vast dialing network that carries telephone calls. Circuits are established merely by dialing the distant point.

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FILMAC reader/printer enables engineer to scan drawing quickly, or make reduced-size copy.

Microfilm Techniques Help Process Industry Shape Miracle Glass

Corning Glass Co. surveyed its engineering repro needs; concocted an economical system for placing drawings on 35mm.

by **FREDERICK D. MEYERS**
*Process Engineering Supervisor
Owens-Corning Fiberglas Corp.*

What microfilming techniques are applicable for an engineering department in a process industry? This was the question which we at Owens-Corning Fiberglas mulled over from 1952 to 1958. The urgent need for an answer was brought out when we centralized our engineering — bringing in our engineering and design staffs from seven different plants into two centralized locations.

Engineering at Owens-Corning is primarily concerned with process equipment and facilities which are peculiar to our industry and our company. We are the oldest and largest manufacturers of fibrous glass products, and in 1958, we had, scattered through our seven plant files and a divisional engineering office, about 80,000 drawings of process equipment, buildings and utility systems, ranging from one to twenty-five years old.

The responsibility for developing an answer to the microfilming question was given to the Design Supervisor of our newly centralized engineering department. The first thing we did was to obtain samples and advice from vendors on 16mm, 35mm, 70mm and 105mm systems (we had limited experience with 105mm used for copying non-reproducible drawings).

Our drawings range in size from 8½ x 11 to 27 x 40 with some roll drawings 42 inches wide by several feet long. We discarded 16mm as being too small for engineering drawings; 70mm because facilities for filming and blowing back were not readily available in the Toledo, Ohio area; 105mm because the cost per image, in file, was two and one-half times that of 35mm. We adopted 35mm film mounted in a Military D aperture card.

Our cards are not punched for mechanical searching — we chose a tab size card so that the cards would be the same size if we adopt mechanical indexing at a later date. Reproduction ratios were set at 29:1 and 16:1 which we were advised in 1958 were the military and



AFTER engineer or draftsman uses aperture card it is dropped in tray and subsequently refilled by clerk (above).

industrial standards. Roll drawings were filmed in sections at 29:1 reduction.

We solicited proposals from three different vendors for filming our tracings in the seven different plant locations. We chose an outside vendor for filming rather than setting up our own equipment because the majority of our filming would be accomplished in the first phase; our annual production of drawings is about 5,000 sheets and we do not need immediate filming as soon as the drawings are completed.

Customized Aperture Cards

The design of the aperture card was worked out with the vendor to the information which we felt most suited to our needs. We have insisted on complete details and typed information on aperture cards to improve accessibility to the stored information. We have also had the roll number entered on each aperture card so that we can readily call for duplicate copies if needed.

The original film was mounted in the aperture card and a complete set of duplicate rolls stored in security vaults remote from any of our plant or office locations. When we finished the filming and mounting programs, we found that we could store 80,000 images in less space than was required for 1,000 tracings.

Our initial problem was retrieval of the image. In 1958 viewing and

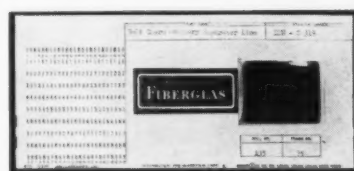
print-back equipment was not nearly so advanced as it is in 1961. We started with a table model viewer with a 14 inch square screen and a hand-held viewer for quick scanning of the aperture cards. This equipment was not satisfactory for our needs and discouraged rather than encouraged use of microfilm cards — our people were writing to the plants for prints from the original tracings rather than using the microfilm file.

Our next step was a portable viewer with an 18 x 24 inch screen. This viewer would display the complete image of a 27 x 40 tracing approximately one-half size and, being wheeled, could be used beside the engineer's or draftsman's desk.

We still lacked facilities for making prints or copies from the microfilm. Prints were available in a minimum of three days time, which was no better than requesting a print from our plants.

In 1959 we heard of the development of a viewer-printer and were impressed with the demonstration of a letter size model. When an engineering type viewer-printer was announced, we immediately ordered one and found on arrival that this was the key to successful use of an engineering microfilm file.

The engineers and draftsmen prefer the microfilm file to diazo prints from tracings because it is quicker and the reduced size of the prints



35MM FILM mounted in Military D card.

make them easier to handle. The microfilm files are "open" files. Any engineer or draftsman may remove the microfilm card, view it or print it, and return it to a tray to be refilled by our engineering clerks.

We are interested in equipment for duplicating the microfilm film directly. If our suppliers make as much progress in the next three years in the duplication of the cards as they have in the past three in enlargement printing, we shall have a card duplicator by 1964.

The cost of setting up a system was relatively small. We found that by using a reputable vendor for filming, mounting, and typing our microfilm cards we could build a complete file for about 20 cents per drawing. This is less than the cost of one diazo print from a large size tracing. The equipment for viewing costs less than \$2,500, including the three different models we purchased. Were we to start over, we could purchase today one completely satisfactory printer for less than \$1,500. □



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MICR IS FAST.

This is the magnetic reading head of an IBM Reader-Sorter. Automatic check processing by banks means that your checks clear fast and that your cash accounting is timely.

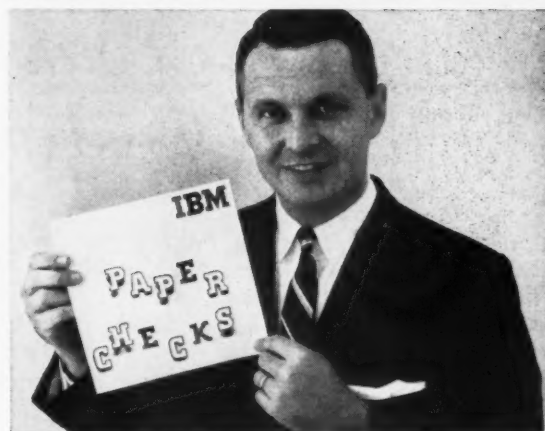


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Let IBM paper checks simplify your work...speed your check processing...improve your record accuracy. Let your IBM supplies specialist go to work for you. He has the facts you need to go MICR. Call your local IBM office and ask for your supplies specialist. And the next time you are in the market for *any* IBM supplies, talk to the IBM supplies specialist. He's an expert backed by experts—a man who can

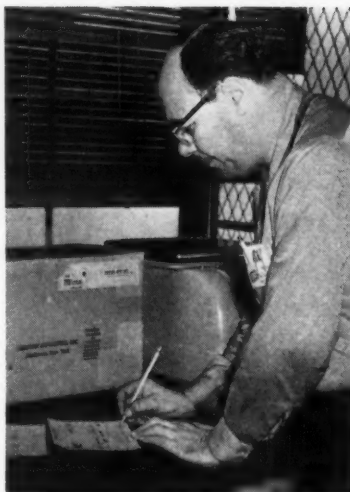
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**Magnetic Ink Character Recognition. (Note: New IBM MICR paper checks are unconditionally guaranteed to meet all ABA specifications for MICR checks.)*

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DATA PROCESSING



THE FIRST step in the operation. Operator enters basic information of incoming order on master edge-punched cards.



SHIPPING papers include combined packing slip-label copy. Shipper adds shipping data and returns other copy to the office.



TYPIST enters shipping information on invoice documents. Special platen insures that copies will not slip and mar registration.

Are Your Forms in Good Form? It May Be Time to Redesign!

by H. U. ZIMMER, *Treasurer*
Thomson Industries, Inc.
Manhasset, New York

The company interested in its own progress, increased efficiency and improved profits will never be satisfied with things as they are. Its management will keep inquiring into even well-established practices in order to discover if it is possible to improve procedures for the benefit of company, customers and employees.

Just recently we, at Thomson Industries, took second looks at our time- and labor-saving IDP order entry-invoicing system. In discussing it with a form specialist from the Standard Register Company we learned that through a simple change in the basic forms we could increase clerical productivity almost 20% and cut close to a third off our wire transmission time. In dollars and cents, our persistent curiosity has been quite rewarding.

The changes suggested comprised a redistribution of the spaces designated for printed information and relocation of some of the preprinted

Thomson Industries did and increased clerical production in its internal order entry-invoice system.

items, without having to change the item input edge-punched cards. By so doing, we were able to cut the form's size from 8½" x 7" to 8½" x 6".

An inch saved may appear small, but as makers of Ball Bushings, Nylon-lined Bearings, and shafts for various industries and products, we know the value of even smaller measurements. When an inch means efficiency and cost savings, it is a valuable inch.

Since operations began in 1947, we have gone from order typing and manual calculations to a punched card, wire transmission and Computer system. The system utilizes cards for customers and items, the Computer for automatic calculation and printing of extensions, and

wire transmission for communication between our main plant in New Hyde Park, N. Y., and our affiliate, the 60 Case Corporation in Lancaster, Pa. All orders come to the New York plant where they are routed through sales and accounting departments and the order information division. During this routing, certain information such as shipping dates, code numbers, discounts, shipping methods, and so forth are added, along with credit information. Other information reproduces the order and retains the original in an open file while the duplicate goes through accounting and then on to production control.

In production control, Ball Bushing and bearing orders are assigned to inventory cards and given a definite shipping date and turned over to order processing. There the Computer operator separates customer from distributor "bill to" orders in preparation for typing orders. To bill customers we use a fourteen-part form and for distributors we use a ten-part form. With master cards for customers and items, the major portion of information is en-

tered automatically with only variable data entered manually.

The same separation as to customer and distributor billing is made on the 60 Case Corporation orders, and they are typed on forms similar in number of copies involved, except that the two copies for shipping have been eliminated. The principal difference, however, is that with the 60 Case orders, the Computer punches out a by-product tape which is later used to transmit the information to Lancaster.

Since Copies 1-8 are fastened separately from 9-14, these are immediately separated into the invoice set (1-8) which is filed awaiting shipment of material and the order set (9-14) which is snapped apart and distributed to the accounting department, the customer, distributor or representative, and the information division as follows:

1. Accounting copy for accounts receivable records and action.
2. Original invoice for either customer or distributor, depending on the type of order.
3. Duplicate invoice for the same as above.
4. Order information copy for the order information division.
5. Extra copy for representative, distributor or customer.
6. Commission copy for accounts receivable.
7. Distributor commission copy.
8. Distributor's branch commission copy.
9. Statistical copy for the accounting department.
10. Packing slip and label combined.
11. Shipping and production control copy.
12. Customer acknowledgment copy.
13. Distributor acknowledgment copy.
14. Distributor's branch acknowledgment copy.

60.0	200	.15	1/2 S	9.00	.00G
20960 NUMBER			SPEC. INSTR.		
JOHN DOE CO 100 MAIN STREET CLEVELAND OHIO			ACCOUNTING COPY		
9001			SHIP TO		
TEK BEARING CO P O BOX 72 BRIDGEPORT 1 CONN			HALL BOHRING		
500 NB 10097			HYLITE		
1026602			80 Case SHAFTS		
3102560500			SOLD TO		
PP			TERMS: NET 30 DAYS - NO CASH DISCOUNT ALLOWED		
C			CUSTOMER ORDER NUMBER 9001		
Q			SHIPMENT & INVOICE DATE		
Q			INVOICE NUMBER 20960		
QUANTITY	CODE	UNIT PRICE	DESCRIPTION	AMOUNT	TOTAL
3	200	9.00	1/2 S	27.00	
1		5.00	SET-UP CHARGE	5.00	
		20.00	DISCOUNT	6.40	
			TOTAL		32.00S
					25.60G

NEW FORM'S changes comprise a redistribution of spaces designated for printed information and relocation of some of the preprinted items. The form's size was cut from 8 1/2" x 7" to 8 1/2" x 6". Instruction space at top of form appears only on accounting and statistical copies.

On transmission of an order to 60 Case, the receiving Teletype in Lancaster is loaded with four-part continuous forms. The form in this case consists of a purchase order, a production order, a packing slip-label combined and a copy which is returned to Thomson Industries to notify our order department that this material has been shipped. Thomson can then invoice the customer. The goldenrod production order is the prime document at Lancaster, also acting as a time card, inventory control ticket and material cost control.

Thus, we have one basic form which has three additional variations as to the number of copies involved and the four-part form at 60 Case Corporation. These provide us with all the documents necessary to process, ship and bill an order.

On the machine preparing these papers there is a device that provides us with additional savings. This is a Standard Register Automatic Linefinder. Instead of having to spend a lot of time moving the forms upward a line at a time when ejection is required, the operator simply pulls a lever at the side of the machine's carriage and that action ejects the used form and brings the next form into position at the first writing line ready for typing.

Following mechanical preparation of the orders, they are checked. The acknowledgments are mailed out immediately. The statistical copy goes

to accounting and the shipping papers are filed and held until two days before shipping is to take place.

When the time comes to ship, the two copies for that operation are pulled and sent to shipping. With the combined packing slip-label, there is no additional writing for addressing the package, the label simply being affixed to the package. On the other copy the shipper enters data as to date shipped, charges, etc., and returns it to production control copy where it then goes to order information for the final preparation of the invoice section of the order.

On a typewriter an operator adds the shipping charges and other information to the seven-part invoice set, separates the copies and distributes them as specified.

The significant point of our recent changes in this area, small though they may be, is that no system can ever be considered so perfect that it cannot be improved with a little extra thought and effort on the parts of management and employees. The simple redesigning of a form to take advantage of the space afforded thereon allowed us to shorten that form by an inch and that inch has provided us with savings in order processing labor and time. That, in turn, means better service to our customers and we know that this is the most important point of all. □



CLEAN removal of carbons is facilitated by quick snap while holding corner of form set.



EXECUTIVES hear explanation of electronic computer which evaluated their decisions in business games seminar at the University of Rochester.

"Will Changing Presidents Affect a Business' Success?"

This and other questions were asked by Rochester U profs at a business game program that drew some interesting answers.

Last fall the president of eight successful companies suddenly swapped jobs. They'll swap again this November.

This game of "executive musical chairs" would have made headlines in every newspaper in the country—except for one thing. The companies involved were fictitious and their "presidents" were successful executives playing a role in an unusual program simulating business decision-making at the University of Rochester.

For a period of ten weeks, 46 leading businessmen from some 31

firms in and near Rochester, New York, spent one afternoon a week participating in an unusual form of laboratory learning. The men were assigned to eight hypothetical companies competing in the same business market. While an electronic digital computer simulated the variables involved in corporate-wide decisions, the executives were instructed to "get out there and make money."

The computer compressed ten turbulent years of business conditions into just a few hours of actual play. All the variables of business

were thrown at the teams — from a boom to a sudden deep depression. At one point, the University of Rochester professors suggested that the presidents swap companies primarily to show the effect of the loss of a "Key-Man" to competition. The objective was not to see who would come out with the best profit-and-loss statement, but to give the participants experience in sound management decision-making.

The teams began each session with a quarterly statement listing their company's sales volume, per

continued on page 42

the new **MICRO-MASTER®** 35mm Camera-Projector by K&E

FIRST with fluorescent lighting. Eliminates hot, troublesome reflector floods, gives better light.

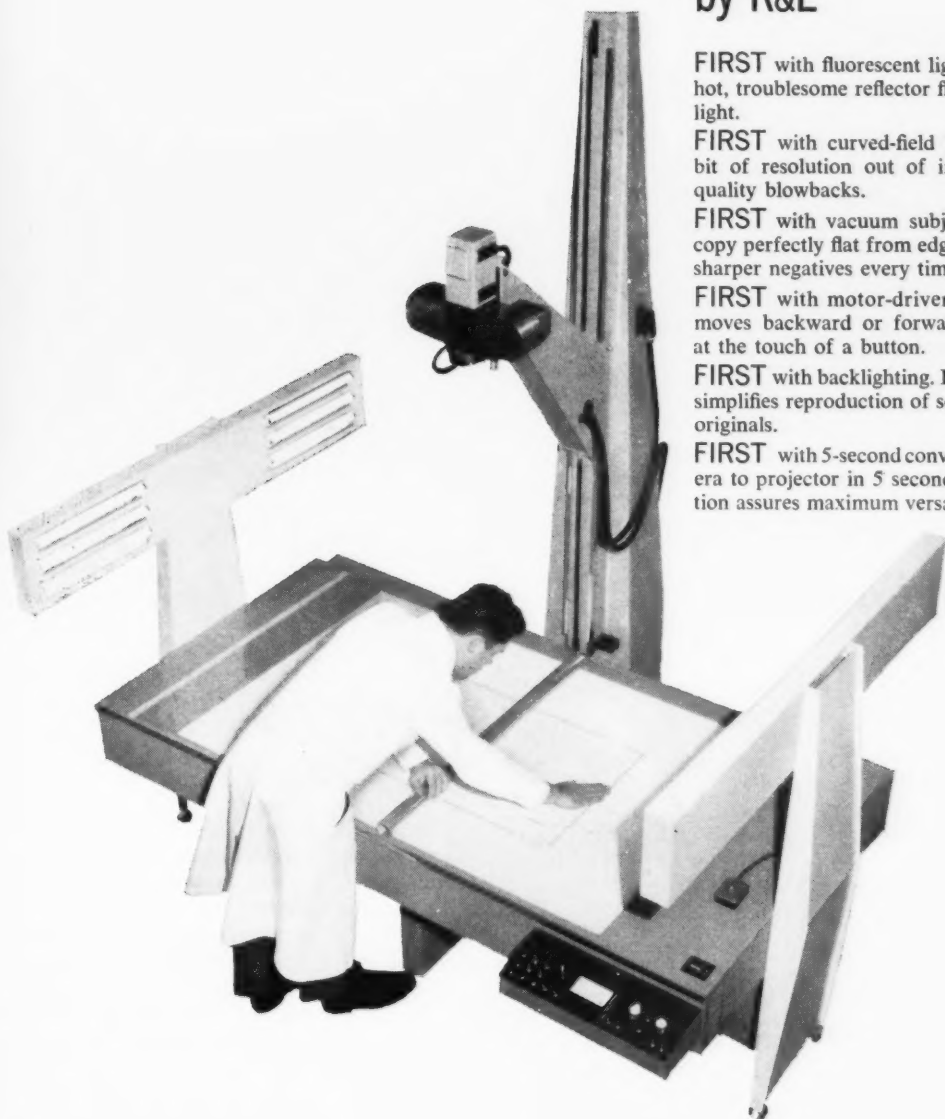
FIRST with curved-field lens. Assures last bit of resolution out of image for highest quality blowbacks.

FIRST with vacuum subject-holder. Holds copy perfectly flat from edge to edge, assures sharper negatives every time.

FIRST with motor-driven projector. Film moves backward or forward for projection at the touch of a button.

FIRST with backlighting. Increases contrast, simplifies reproduction of soiled or two-sided originals.

FIRST with 5-second conversion. From camera to projector in 5 seconds—simple operation assures maximum versatility and output.



A host of technical firsts and *finests* make this the most efficient 35mm unit yet perfected. Specifically tailored for engineering miniaturization and repro-

duction, the new MICRO-MASTER 35mm Camera-Projector enables greater accuracy than any other 35mm unit. The more you learn about this new unit,

the more you'll want it. To get the full story, see your local K&E dealer, or fill out and mail the coupon below:



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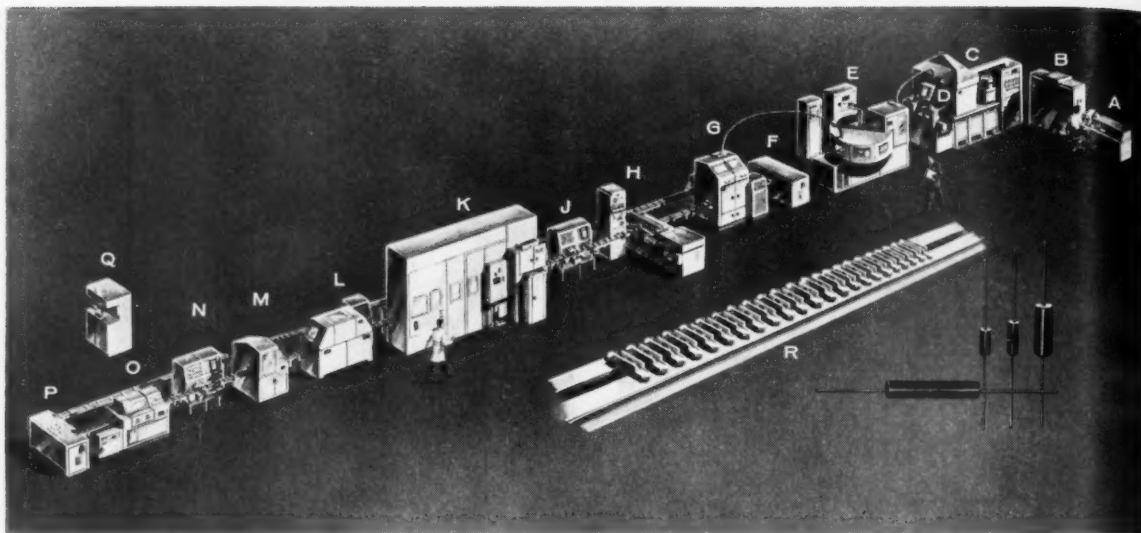
Please send me complete descriptive literature on the new MICRO-MASTER® 35mm Camera-Projector by K&E.

Name & Title: _____

Company & Address: _____

4054

Circle No. 514 on Post Card



SHOWN ABOVE are the machine stations in the automated production line for manufacturing deposited carbon resistors. From right to left they are: (a) computer; (b) output-input control station, (c) coating station, (d) first inspection station, (e) terminating station, (f) conveyor control equipment, (g) capping station, (h) helixing

station, (i) second inspection station, (k) encapsulating station, (l) leak detector station, (m) marking station, (n) third inspection station, (o) packing station, (p) conveyor control equipment, (q) cap-lead welding machine, and (r) detail of conveyor line. Length of the line is 110 feet, with a maximum machine width of about six feet.

Resistors Exit Assembly Line "Untouched By Human Hands"

**Western Electric
eliminates human
error with mech-
anized processing.**

Reliability — this quality gives computers the advantage over people in the manufacturing process.

The quest for increased reliability triggered the design and development by the Western Electric Company of a computer-controlled carbon resistor production line. In operation at the company's North Carolina Works in Winston-Salem, this system combines statistical quality control with fully mechanized processing.

Resistors are electronic components that must meet severe electrical requirements, yet operate without failure for years on end.

The resistors are used in a variety of electronic equipment including radar and missile control systems. In certain defense equipment, a failure rate of no more than one per 200 million hours of operation is permissible.

The production line consists of eleven stations, all tied into control by a general purpose Librascope LGP 30 computer. Feedback of process data from three key points along the line permits rapid closed-loop operation.

In The Beginning — — —

The process begins with the deposition of carbon on a tiny ceramic core. Then the core goes successively through inspection, termina-

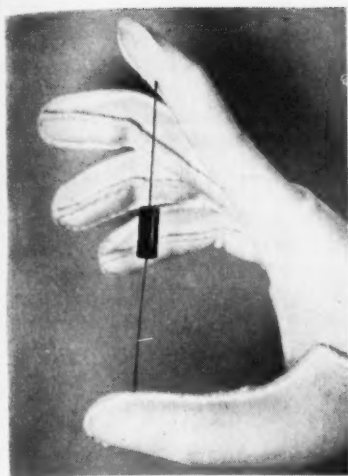
tion, capping, spiralling to value, second inspection, molding of a protective case, marking, leak inspection, final inspection and packing.

Basically, the computer performs in three areas:

1. It programs production control. Up to a month's requirements can be fed into it at random.

2. Using the methods of statistical quality control, it analyzes control data plotted at three critical points in the automated process and applies statistical tests to determine if a trend is developing.

3. It formulates the information to detect any drift away from the accepted manufacturing tolerances. No control action takes place while this analysis indicates normal statistical distribution around a desired nominal. But when a trend away from this condition develops, the computer uses stored data to cal-



OUTPUT of the production line is this deposited carbon resistor untouched by human hands during the manufacturing process. It differs from the manually manufactured ones only by its proven greater reliability.

culate new setup information for the appropriate station.

Each resistor consists of a short ceramic rod or core which is first coated with carbon. A conductive gold coating is applied to each end of the core for attaching a cap and wire terminal. Then a spiralled groove is cut into the carbon film, to change the electrical path on the core and raise the resistance to the desired level. Finally, the resistor is encased in a cylindrical, epoxy plastic cover for protection. Maximum production rate is 1200 finished resistors per hour.

Though applicable to the production of conventional resistors and, at least the concept of statistical control, to other electronic products, this system will be used only for these resistors.

Former Procedures' Shortcomings

Until now, individual precision products have been made by manual or semi-automatic processes that invited contamination from handling and related shortcomings of human control.

By adopting advanced automation, contamination disappears as a problem, production is increased, and a level of reliability is attained that manual methods cannot match. The advantages that result are reflected in low unit costs. □

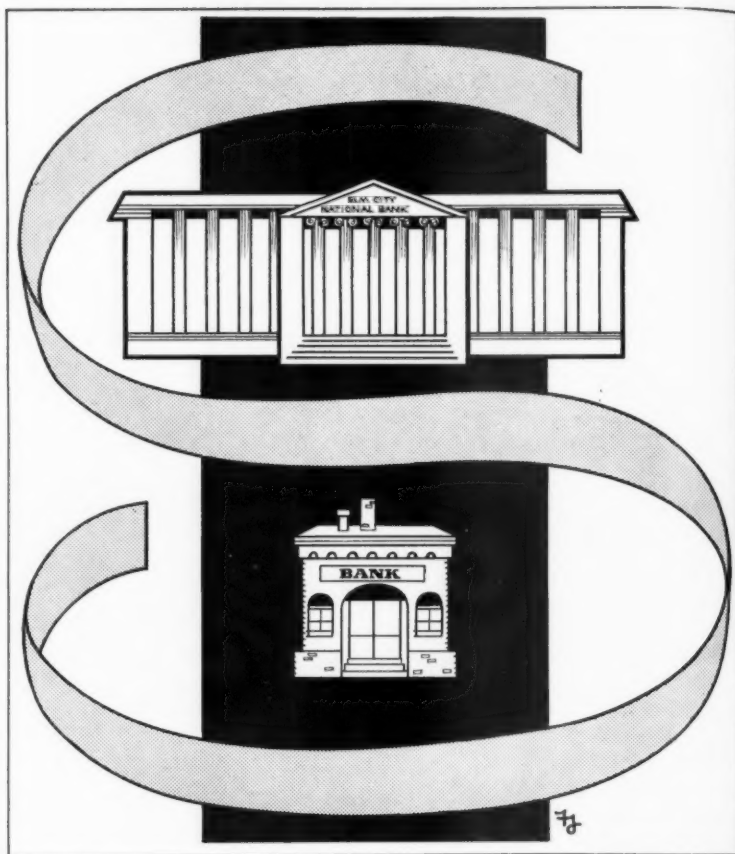


"This one needs a new cathode." That could be what G. L. McClamrock is telling A. J. Matthews, a fellow engineering associate at Western Electric's North Carolina Works. They are inspecting the computer-controlled terminating machine in the automated production line. The gold cathode in the bottom of the bell jar he is holding is used to sputter a layer of gold on the ends of the resistor core.



OFFSET printing is used in the marking machine which stamps on the wattage, resistance value, production lot number and date. C. W. McCachern, Development Engineer, inspects the planetary gear arrangement which mounts the blanket roll and inking rolls and permits the type head to remain stationary. Servo drives can set any one of 45 code numbers with over 1 1/2 million permutations of code and resistance value combinations.

Equipment Co-ops
are the answer
for two groups
in Texas who set
up EDP centers.



Computers For The Small Bank?

Riddle for a small bank: how to employ economically electronic computers for data processing and accounting, equipment whose optimum use often requires a volume of business far greater than that of any one small bank?

Ten small Texas banks have resolved this difficulty by forming equipment cooperatives. Two separate groups are involved, one of seven banks in San Antonio, and the other of three banks in Texas City. Both formed separate corporations to purchase and operate Burroughs B251 Visible Record Computers.

Plans of each group call for computers to be housed in special buildings designated as Document Processing Centers. The San Antonio banks lie within 12 miles of each other, the Texas City banks within 6 miles, and the document processing

centers are to be established in central locations.

Daily document receipts and pertinent customer records of member banks will be transferred to these centers at the close of each banking day for processing on the computers and updated records transferred back to the banks prior to opening the next morning.

Demand deposits will be among the first banking records maintained on the co-op computers, to be followed by savings, installment loans and commercial loans records. Initially, the San Antonio group expects to process more than 32,000 checking accounts on its computers while the Texas City group will muster over 16,000. These volumes will insure economical use of the VRCs from the outset while still allowing ample room for growth, according

to the groups' officials.

The computer system's sorter-reader unit processes incoming documents encoded in magnetic ink and then transfers the information to a ledger processor which automatically updates the appropriate customer account record.

The computers are expected to be fully operational some time in 1962, by which time the banks estimate that a sufficient number of customers will be using checks encoded in magnetic ink to make use of the VRCs practical. Information is to be printed on these documents in the E 13B type font of Magnetic Ink Character Recognition (MICR) — the so-called common machine language of American banking — which can be read directly by the human eye as well as by electronic equipment. □

Repro, Systems Men to Talk Shop

Information retrieval and miniaturization are but two topics of high interest to systems men which will be discussed at the forthcoming Visual Communications Congress. The gathering is planned for December 2-5 at Los Angeles in the Biltmore Hotel. Co-sponsors of the meeting are the Society of Reproduction Engineers, American Institute for Design and Drafting and the American Records Management Association.

The four-day event will attract an audience of 8,000 made up of supervisors and administrators of reproduction services, methods analysts who survey these activities as well as the buyer of reproduction equipment. Every state in the union will be represented, with many foreign visitors attending.

Among the technical sessions is one on Saturday headed by M. P. Myers of North American Aviation. His subject titled "Today's Programming and Tomorrow's Progress in Miniaturization Systems for American Business, Government and Industry" will be discussed afterward by a panel consisting of D. W. McArthur, 3M; James Cloney, Ozalid; Thomas Bell, Photostat; and Peter McColough, Xerox Corporation.

"Electrostatic Printing Systems," a session slated for Monday, will be chairmaned by Russell H. DeRosa of Ford Motor Company. Albert W. Dunning of Plastic Coating; Leonard Florsheim, Jr. of Robertson Photo-mechanix; Stuart Arnett of Radio Corporation of America; C. S. Margach of Addressograph-Multigraph; Donald Alnutt of Philip Hunt; and G. T. Gerlach of A. B. Dick will discuss the topic.

Paperwork Seminar

Separate topics under the broad heading "Tomorrow's Programming in Paper Work" include the following: paper specifications, Larry Hardy of Zellerbach Paper; area planning, Howard W. Knapp of General Fire Proofing; forms design, H. E. Moelker of Moore Corp.; and internal paper work, W. K. Wilson of Diebold. Walter H. Lacey of

Title & Trust Company will head the group, meeting Monday.

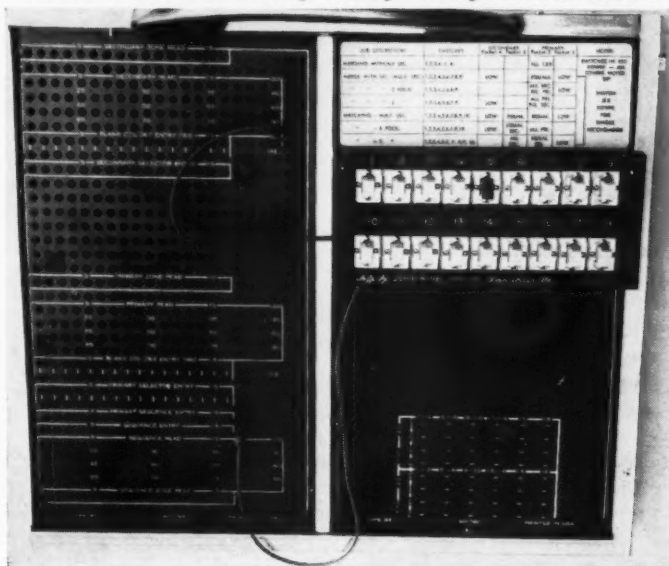
Covering the vital field of information retrieval on Tuesday will be the following experts: Allen G. Negus, Naremc (record center operation); C. G. McCune, TAB Products Company (filing equipment); F. L. Hilton, Jr., Recordak (microfilm); IBM (computers).

Heading this group will be Jack Morgan of Diebold.

In addition to the important technical sessions more than 100 companies producing equipment, machinery and supplies for this \$10,000,000,000 industry will use in excess of 75,000 square feet of space to display the latest techniques, methods and equipment. □

INTRODUCING A COLLATOR SWITCH PANEL

FOR USE ON
IBM TYPES 077, 085, 087, and 089.

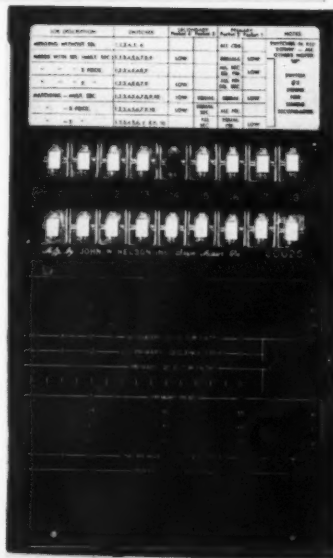


THE PANEL, CONTAINING EIGHTEEN SWITCHES, IS CAPABLE OF PERFORMING 45 DIFFERENT MACHINE OPERATIONS. THE ONLY REQUIREMENT NECESSARY FOR ITS USE IS TO WIRE THE CARD COLUMNS, SET THE SWITCHES (AS OUTLINED ON THE INSTRUCTION BOOKLET) AND PUSH THE START BUTTON.

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Circle No. 319 on Post Card

Railroad's Communication System

Shippers now get shipment locations in seconds with EDP and facsimile.

Roars Down the Tracks

Speeding rail freight information faster than the freight itself has been accomplished by the Denver & Rio Grande Western Railroad's new Shipper Facts system.

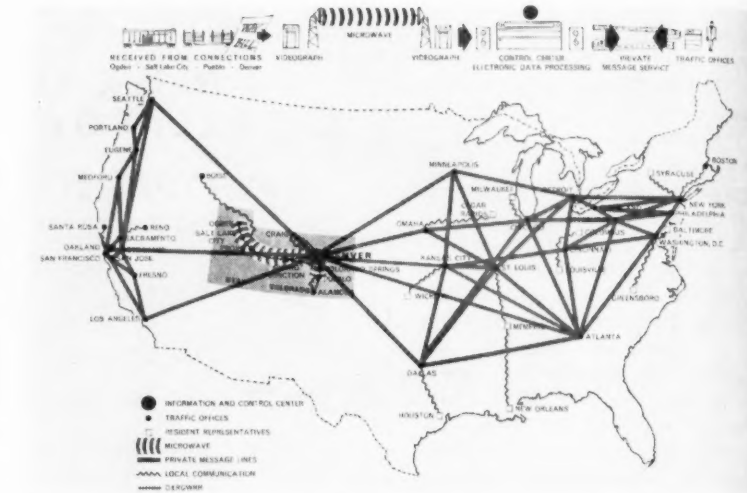
Integrating EDP with electronic communications, the Rio Grande can transmit waybill copies, which contain information on freight shipments, in seconds to its traffic agents. In turn, the agents can inform inquiring shippers and receivers of any shipment's location on the Rio Grande tracks within minutes.

The system combines A. B. Dick's Videograph, high-speed facsimile transmitting and receiving equipment, with a 700-mile microwave network built by Motorola Communications that links six traffic offices in Colorado and Utah to the railroad's Denver headquarters. "Off-line" traffic offices and agents throughout the country are linked to Denver by private wire service.

All freight information is collected in Denver, converted to punch cards and fed into a Burroughs 220 computer. The data is stored on magnetic tape for subsequent processing and answering of customer inquiries.

The punched card data is also punched onto paper tape for automatic transmission over Western Union leased lines to 28 "off-line" traffic agencies in the U. S. to keep traffic agents, shippers and receivers informed on the progress of shipments.

If an inquiry is made on any car not yet delivered to the Rio Grande, the request is "banked" on magnetic tape. When the car is received, a message will be printed out automat-



MAPS-EYE VIEW of the Denver & Rio Grande Western Railroad's new Shipper Facts system. It speeds rail freight information through the line's network of traffic representatives. The system combines high-speed facsimile transmitting and receiving equipment with a 700-mile microwave chain.

ically and the person making the original inquiry will be notified immediately.

Information stored in the computer to keep tabs on all freight cars is also used to perform the railroad's complex "car service accounting." This includes computation of per diem payments to other railroads for their cars while they are on the Rio Grande system as well as rental due from other carriers for Rio Grande cars on their lines.

In still another application, the electronic system will be used to maintain — on magnetic tape — a carload inventory of principal terminals. At any time, a report of cars on hand in any terminal — including the commodity, tonnage and destination of each — can be printed out at the rate of 150 cards per minute, providing a complete picture of business on hand. This will enable yardmasters to move cars expeditiously and economically.

Aside from keeping track of more than 50,000 passenger and freight cars that move over the Rio Grande's lines each month, the computer will be used for writing payrolls, manpower distribution reports, and reports on tonnages, commodities and earning forecasts.

The computer system has been modified to permit interruption of regular processing routines to "interrogate" the system's Datafile, a magnetic tape storage unit, on the location of any Rio Grande car and any car on the railroad line. Magnetic tape records will be up-dated every four hours to reflect all train movements within that time period.

Reflecting on both purpose and result of the Shipper Facts system, one railroad official said: "When a man calls up to find out where his shipment is — and he gets the answer in 30 seconds, he'll probably say, 'Now that's the way to run a railroad!'"

PR SYSTEMS GROUP STARTS KEY PROJECT

The first phase of a project of vital importance to the railroad industry, and transportation in general, is being undertaken by the Railway Systems and Management Association.

The project is concerned with the development of a simple, economical data handling system for control of freight shipments from origin, through carriers, to destination. It anticipates an integrated data processing system capable of capturing accurate data at the human source, transcribing it to a common language, and then utilizing this data with as little human intervention as possible.

Not As Easy As It Looks

At first view, the problem appears to be a simple one — combine three forms: Bill of Lading, Waybill and Freight Bill. A closeup of just the railroad end of the problem shows it to be more complex. First there are individual systems and equipment problems. These are compounded by the individual characteristics of each railroad — i.e. road haul, terminal road, etc. In addition, many commodities shipped by rail are sold in transit. Such buying and selling may occur up to six times a day with each buyer designating a different destination and creating new routing instructions.

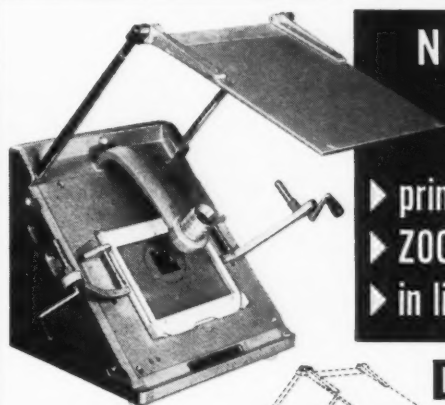
RSMA's project aims to reduce the 2.3 million pieces of paper involved daily. Phase I will be to define the problem in detail. Phase II will be a feasibility study and proposed solution. Phase III will be creating of a working model.

A project control group consisting of representatives of shippers, data processing suppliers, communications companies and railroads has been set. The group welcomes all inquiries on the project. Interested parties should contact: Grant C. Vietsch, Executive Director, RSMA, 163 E. Walton Street, Chicago, Ill.

SM To Highlight Transportation Systems in All Future Issues

Beginning with this issue, *Systems Management*, will cover the latest developments in transportation systems on a regular basis. That coverage begins in the columns to the left. All fields of transportation — rail, sea, air — and their fast-

moving systems innovations will be chronicled as will the activities in the field. The transportation industry is a leader in systems applications. Many of its ideas are now successfully at work in other industries which have adopted them.



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Camera, AVR Reading Rateometer and
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By moving mirror on its telescopic arms, magnification can be varied through a wide range without the trouble and expense of extra lenses. A Dagmar exclusive.

LOWEST COST—MOST FEATURES

Dagmar Supers are equipped with lens, zoom mirror, reel arms, magnetic filmstrip holder, spare bulb, 16mm and 35mm take-up reels and carry-case. Made in Holland by expert craftsmen.

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Reel arms snap in or out of secure sockets in seconds, accommodate 35mm or 16mm reels. With arms removed, magnetic holder moves easily to project all types of sheetfilm.

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In its rugged carry-case, reader measures only 9 inches on each edge, weighs 16 pounds. Durable grey crystal finish.

Select the model best suited to your needs. Buy Model A unless you have special reasons for choosing Model 16 or 35

Model A—The Most Versatile and Widely Used Model—for Standard American Microfilm

Especially designed for standard 35mm rollfilm, aperture cards, microfiches, mounted stripfilm, and film jackets. Zoom control enlarges 12 to 20 times. **\$139.95**

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For special low reduction 35mm systems. Zoom control enlarges 10 to 15 times. Aperture 30x42mm. **\$145.95**

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6-MONTH GUARANTEE... DAGMAR readers and cameras which develop a defect due to materials or workmanship within 6 months will be repaired without charge. This does not include breakage due to mishandling or lamp filaments consumed in use.

Circle No. 501 on Post Card

Punch Cards Solve 'Weighty' Problem

They control the weighing cycle, vital to abrasive production.

Precision weighing is a critical factor in the production of abrasives. This factor was well recognized by the Norton Company of Worcester, Mass., when it was designing its new organic bonded grinding wheel plant in Teterboro, N. J. Any errors in weighing the abrasive and bond into the batches used in molding the grinding wheels can seriously affect the finished product.

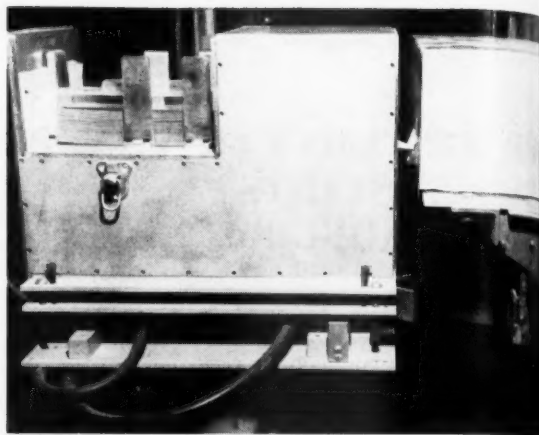
Wanting to improve product quality, the company decided to include punch-card operated, automatic weighing equipment to increase accuracy over manual scales.

The system now in use consists of three weighing carriages suspended by a monorail which travels in one direction under a row of tanks containing the various sizes and types of abrasive grain and bonding materials. To operate the system, the mixing foreman places a stack of standard IBM punched cards in a pedestal-mounted dispenser at the beginning of the cycle. As the carriage is brought into position, the dispenser issues one card to it representing one batch of mix. The card then takes over the control of the carriage which acts as a robot throughout the cycle, drawing the correct amounts from the proper tanks and finally discharging the hoppers at the correct mixing stations.

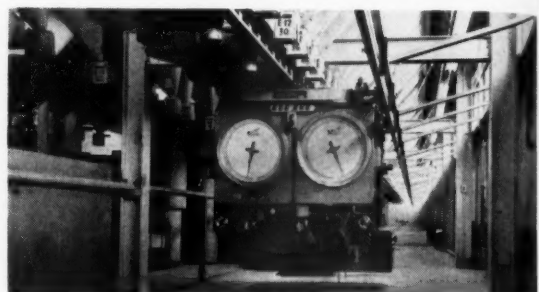
Prepared from orders, the punched cards inform the control equipment on the carriage of: the abrasive grain tank from which to draw (this determines the types and size of abrasive), the tank of bonding material from which to draw, the required weights for both, the mixing station designated to receive the batch, and any necessary instructions for the mixer operator.

When the carriage reaches the mixing station, the card has fulfilled its primary function and falls into a pocket on the side of the hopper. It is used by the operator for additional instructions. The card then becomes the operator's piecework coupon. It is returned to the plant office where the accounting department draws off items such as usage of grain, bond, and mixing machine production.

Manufactured by the Heltzer Steel Iron and Form Co., the system was installed on the basis of improved quality of product. The accuracy inherent in an automatic weighing system is far greater than that which can be expected in a manual operation. This fact has been confirmed many times over for Norton since the system went into effect. □



CARD is issued to the control system from the card dispenser, left. Card initiates cycle and stays with the carriage to mixing station.

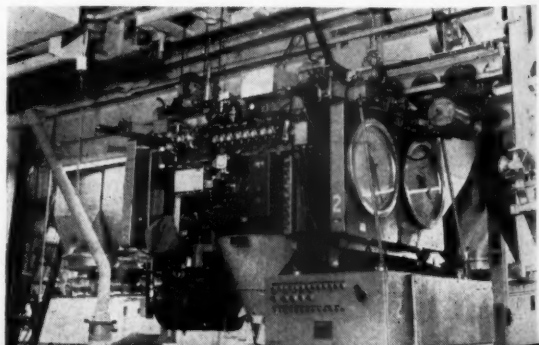


CARRIAGE moves down the tank line to draw the batches of abrasive grain and bonding material. No human attention is required.



MIXER operator checks card for any special instructions. Card now serves as a piecework coupon, and is discharged into hopper pocket.

CARRIAGE descends to low level track after discharging full hopper. On reaching the low level, the carriage starts the next cycle.



records retrieval

continued from page 15

pears that graphic image and digital data processing equipment should be separated but linked in such a manner so that digital memory can be searched for the specific address of graphic data (engineering drawings, entire text pages, etc.) in a photo memory file. Sound mechanized systems must be built on a solid foundation of pin-point classification and indexing controls. The system will be only as good as its classification and indexing pattern.

It also appears that output of photo memory files will have wider use in the form of xerographic microimages rather than visual display (typing up equipment) and full-size hard copy (more expensive). Xerographic microcopies will permit multiple copy transmission and display, multiple copy exposure on a single document or card, and an important feature of add-on of additional microcopies as documents are added to the system. It is also possible that xerographic microimages on punch cards will receive wider use than film chips on cards (aperture cards) because of lower costs, easier manipulation and add-on capabilities.

Base For Future

Xerographic microimages on punch cards may be the keystone to an effective information dissemination of Business Intelligence System. In such a system, all documents are characterized in symbolic language by a vocabulary or pattern of key words. Information profiles are identified for each person being served by the system — using the same vocabulary or pattern of key words. The system then attempts to match key word patterns identifying documents with key word patterns representing information profiles for individuals. If a given degree of similarity exists between the two, the affected participants are notified by a card carrying an abstract of the document (or a xerographic microimage). The recipient signifies whether the information is in fact relevant or not by returning or not returning a stub provided with the card. An affirmative response is re-

flected on the individual's profile by incorporating the pattern of the accepted item. Thus, information profiles are cumulatively adjusted and sharpened through feed back of yes or no match responses. At the same time, feedback serves to notify generation of information as to the reception and use of the data they create and provides a realistic sensitivity to need and use.

Records executives and administrators can play a key role in de-

veloping a state of readiness and systems compatibility in their respective companies in order to prepare for judicious use of mechanization. A state of readiness and systems compatibility can accomplish a great deal toward the end of streamlining paperwork systems *now* and sharply reducing conversion costs when mechanization is introduced. Machines will not solve the paperwork problem — the indirection of human intelligence will! ☐

If you use Microfilm

YOU NEED A DOCUMAT READER-PRINTER!

The microfilm reader that
makes prints on the spot

If you use microfilm, as so many do today, there's no need to wait for prints. As you scan the film on a big, clear 11" x 11" viewing screen, you may stop at any frame, press a button, and the machine will hand you a clear print.

No machine like Documat

Note these exclusive features:

- large, clear image, even under bright lights
- large, clear 8½ x 11 prints, on white paper, neatly trimmed
- no cracking, peeling, or torn edges
- fully automatic, even cuts the paper

ANYONE CAN OPERATE IT
JUST 3 SIMPLE STEPS
TO MAKE A PRINT

1. Turn on switch
2. Locate the frame
3. Press the button

USE IT AS
A READER
OR PRINTER
—OR BOTH!

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for Complete
Information
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DOCUMAT



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Please send me complete detailed literature on the
DOCUMAT Reader-Printer, with information as to
where the machine may be seen in this area.

Name
Title
Company
Address
City Zone State

Circle No. 505 on Post Card

data-phone

continued from page 20



telephones in operation throughout this country! *We foresee, in the future, the time when machine conversations will equal the number of voice communications over the telephone!*

The telephone network has been developed to meet the day-time peak needs of millions of customers. By comparison, it practically lies idle during the late evening and early morning. Machines, however, do not need to sleep as we mortals do. Just around the corner are further developments in data transmission that will allow business machines to turn themselves on in the dead of night, place their own call to another machine, transmit all the data stored during the preceding day, then turn themselves off again.

A card reader device developed by the Western Electric Company and licensed for manufacture by several business machine companies that works in connection with Data-Phone promises to bring about a minor revolution in the laboriously slow field of order handling. Picture a typical installation — a factory and a dozen warehouses or supply centers around the country. To order supplies from the factory with the card reader and Data-Phone service, a supply clerk first calls the factory's "automated order department" by phone. Then, he inserts into the card reader his identity card which automatically tells the factory the name and location of the warehouse ordering. Next, the supply clerk inserts a card which corresponds with each item being ordered and he then keys in the quantity desired. As fast as he does this, the card is reproduced at the receiving

end. It's as simple as that.

This process means that the factory can start to process an order minutes after a customer has phoned the warehouse. Shipments are on the way to customers at least a day before the factory could receive an initial written order by mail. It avoids chance of error if the order is called in. It also eliminates the time required to manually punch cards.

The day is not too far away when a salesman, returning home from a business trip, may be able to submit his order to the factory via Data-Phone. By using the card reader method, his order will be received in punch card form at the factory in less time than he could write up a traditional sales order and drop it in a mailbox. When that salesman goes to sleep after his trip, he'll know that his orders are being delivered — not to the factory but from it to the customer.

One day, this same principle may enable a housewife to shop conveniently from her home. She will be able to order all her groceries at any hour of the day or night by merely calling a special number at her automated supermarket, inserting punch cards and keying in the quantity desired.

Data Photo for Bills

At the end of the month, this same housewife may also be able to pay her bills by Data-Phone. First, a call will be made to the bank where her account is maintained. Then, an identity card will be inserted in the card reader followed by a special card corresponding to the store where she has a charge account, the bank where she pays her mortgage, to various utility companies or to other regular creditors. Then she can key in the amount on her "phone check" and her bill is paid.

One day, this new service may be helping to read your gas, electric and water meter at your home by remote control. A silent telephone call from the utility company to your meter will obtain an accurate reading, making the human meter-reader available for more productive occupation.

A remote alarm system is also a future possibility. Fire, a break in a pipe line, or the breaking of a window or door could automatically result in a call being made to an emergency center after which a recording would loudly proclaim: "There's a fire or other trouble at 72 Elm Street." Such a system would provide a constant, never-sleeping alarm system for your home.

Also within the realm of possibility is the use of Data-Phone service to aid in obtaining a true and almost instant radio or television audience poll. Silently and unnoticed by the listener, electronic devices could query your television set, determining what channel you are tuned to. Think what it would mean to advertisers and to the entertainment industry to have a completely accurate rating *before* the program was over!

One day you may be able to make a call to your home to activate appliances. After dialing your regular telephone number, a dialed code could turn appliances on or off. When this day comes, there will be no fear of leaving for vacation and forgetting to turn off the gas heater or other appliances. You'll simply go to the nearest telephone and "tell" it to stop.

Today many businesses are using data services to improve their operations. Chemical, mining and petroleum companies; metal and rubber fabricators; drug, dry goods and grocery wholesalers; banks and insurance companies; telephone, electric and gas utilities; railroad, airline pipeline and freight hauling companies are only some of them. It has been estimated that business will be spending over 250 million dollars a year on data origination and transmission equipment by 1970. The Bell System estimates that they will have more than 200,000 Data-Phone data sets in service by this date. With the large investment that companies are making in electronic data processing equipment and its importance in our scheme of management, it behooves all of us to understand and use effectively this new tool of systems management. Study and understanding are the key words for the future. □

AN OVERWHELMING ENDORSEMENT FROM THE SYSTEMS INDUSTRY

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Bi-Monthly

STARTING JANUARY 1962

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We are happy to inform you that **SYSTEMS MANAGEMENT** will publish bi-monthly in 1962—with our pledge for a bigger, more informative, more helpful magazine. We look forward to your continued active interest and trust that we will continue to enjoy your confidence.

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New free literature on the latest developments in the data processing and microfilming fields. Each item listed has a key number. For more information circle that same number on the Readers Inquiry Card.

Microfilm Equipment

Diazo Microfilm 201

Ozalid Div. Literature on the new Gamma Diazo Microfilm describes its advantages.

Microfilm Applications 202

3M. Booklets describing the use of microfilm in three Federal Government agencies.

Microcopying Kit 203

Idea. Spec folder on new portable Microcopying Kit for small-scale operations.

Microfilm Data 204

Bell & Howell. Booklet describing characteristics of B & H microfilm products with technical data.

Portable Microfilmer 205

Recordak. Flyer on the Recordak portable microfilmer with a 20-to-1 reduction ratio.

Portable Camera 206

Photostat Corp. Literature available on portable camera.

Magazine Camera 207

Photo Devices. Data on the model 1088D, a 35mm microfilm camera with detachable take-up magazine, requiring only 8'6" ceiling clearance.

In-Plant Processing 208

Milsco Manufacturing Co. Four-page brochure with complete specs and step-by-step operational diagram of Cramer continuous film processor.

Filing System 209

Microtape Systems. Data on a low cost filing system for business records.

Portable Camera 210

Microdealers. Data on the Corvette, compact camera available through Microdealer affiliates.

Microcard Copier 211

Microcard Reader Corp. Folder describes automatic Microcard Copier Type 1 operation and lists specs.

Miniaturization Equipment 212

Keuffel & Esser Co. Information about

two dynamic new developments in miniaturization of engineering drawings.

Microfilm Processing 213

Houston Fearless Corp. Brochure on the Microfilm Labmaster for microfilm processing.

Microfilming Information 214

The Gevaert Co. of America, Inc. 28 pp. booklet gives valuable information and data about microfilming.

Splicing System 215

Hudson Photographic Industries. Free samples of Quik Splice tape and #AVMF illustrated catalog.

Microfilm Reader 216

Audio Visual Research. Information on Dagmar Superscope for microfilm reading. This unit projects roll film, aperture cards, and microfiches.

Computers and Accessories

Hi-Speed Communication 218

Teletype. Information on the Hi-Speed Communication set, including transmitter and receiver, for tape-punched data transmission and voice communication.

Automatic Panels 219

J. W. Nelson. Folder on the new Mac-Switch automatic control panels with operating instructions.

Tape Storage 220

Monarch Metal. New catalog of Fil-away line for tape and panel storage, both vertical and horizontal.

Wire Guide 221

Panels Wires. Twelve-page booklet entitled *Pocket Guide for Self-contacting Wire Complements*.

Film and Tape Safe 222

A. M. Kuechmann. Information on specially-designed safe for magnetic tapes and microfilm with a "floating" inner repository which protects against fire, moisture and steam.

Panels and Wires 223

Futronics. Price list available on control panels and wires.

Control Panels 224

Virginia Panel. Folder lists and illustrates advantages of firm's line of control panels and wires for IBM equipment.

Electrosensitive Paper 225

Alfax. Bulletin offers information on Alfax Type "A" electrosensitive recording papers used for helix or stylus recording in business facsimile, picture transmission, and other instrumentation.

Analytical Instruments 226

Norelco. 28-page catalog contains specifications and operating data on seven key instruments for research and production control.

Optical Scanner 227

Farrington. Spec folder on Optical Scanner Model 1P5P.

Data Recording 228

Standard Register. Booklet describes Stanomatic total system concept for transcribing labor distribution and production control source data.

Input Automation 229

Dashew. Booklet on Printapunch unit lists its applications in data collection.

Automatic Card Verification 230

Monroe. Folder on Synchro-Monroe card punch verifier explains its operation and varied uses.

Scanning Punch 231

Rem Rand Univac. Booklet describes purpose and operational features of the Optical Scanning Punch.

Hardware Housings 232

Gates Acoustinet. Folder presents specs and advantages of hardware noise-reducing masonite units.

Computer Applications 233

Minneapolis-Honeywell. Applications of the Honeywell 400 computer for business record-keeping are described.

CARDS AND FORMS

Stock Forms 235

Watts. Catalog illustrates 30 commonly used office and tax forms.

Formscard 236

Forms Inc. Data on continuous tab cards made without medial waste strips.

EDP Indexing 237

G. J. Aigner Co. A 16-page booklet describing indexing products to facilitate data processing.

Punch Card Files 238

Wright. Folder introduces new Gold Star Files for horizontal card handling.

Systems

Programming Aids 240

IBM. Literature available on two new programs, 7090 FORTRAN and 7090 Sort System, for scientific computation and reorganization of magnetic tape stored data.

Real-time System 241

Stone Labs. Eight-page brochure entitled *Phase One: A Real-Time Updating and Processing System* outlines the design approach to a typical system for mutual savings banks.

Digital Processing 242

Reese Engineering. Brochure describes the Findafact 2510 Data Retrieval System, a digital data processing system that transcribes punch card data to magnetic tape, retrieves information and maintains tape files.

Planning a System 243

Charles Bruning. "Basic Microfilm Indexing and Filing Techniques" tells how to achieve maximum results from a microfilm system.

Monitoring Systems 244

Monitor Systems. Brochure describes Series 7000 line of modular Digital Data Systems for alarm scanning and digital recording of analog values.

Computer System 245

Bendix Computer. Six-page brochure illustrates the hardware, software, and service features of the G-20 computing system and customer support program.

Information System 246

General Electric. This 8-page booklet describes the GE 225 Electronic Search Program for information storage and retrieval.

Production Control 247

RCA. Brochure describes a supervisory control system for oil and gas production, the RCA 130 ALERT system.

Miscellaneous

Filing System 249

Visi-Shelf File, Inc. Catalog describes the Visi-Shelf Filing System.

Heat-transfer Machine 250

Cheshire. Literature available on new type rotary head heat-transfer machine that imprints addresses from roll strips and pack forms to printed pieces at high speeds.

Photo-copying Tool 251

Douthitt Corp. Information on the

Repro-Neer copyholder which eliminates distortion from folds, etc.

Portable Prompter 252

Telit Industries, Inc. Information on the TelExecutive, a portable electronic prompter for speakers.

Visual Board Control 253

Graphic Systems. 24-page booklet (TA-20) explaining visual board to monitor and control operations.

Programming Techniques 254

Collins Radio. Potential users of PERT

are offered a "Program Packet" describing a management scheduling and control program for use on IBM 7070.

Files Manual 255

Equipto. A 64-page guide to shelving and filing the 1961-62 Reference Manual includes sections on punched tape and IBM card storage files.

Flexible Light Control 256

American Optical Co. Booklet explaining fiber optics theory which enables direction of light by light pipes and applicable to data processing.

DYNACOLOR* TYPE II

A New High Resolution Microfilm AT LOWER COST

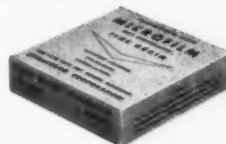
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Again Dynacolor Corporation meets demand with a new cost-saving, standard-speed negative microfilm. Easily removable dye-backing offers processing convenience. Dynacolor Type II can be processed by any commercial microfilm service; no scrubbing or special equipment is required.

A trial will convince you that here is a way to reduce microfilm costs and still maintain highest quality.

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THE VALUE LEADER OF THE PHOTO INDUSTRY

Circle No. 506 on Post Card

computer games

continued from page 28



cent share of industry sales, inventory, production capacity, and profit-and-loss statement. These figures were then used as a basis for decisions on price of product, production volume, advertising budget, research and development budget, investment in plant and equipment, and dividend policy. The decisions made were punched into cards and fed into an IBM 650 computer.

The IBM 650 was programmed with a mathematical model of a business economy — including such factors as an economic depression and other typical market variables. When the team decisions were entered, the 650 computed their interaction and issued the results.

Varying Approaches

Although there were no winners or losers in the game, there was a wide variance in planned competitive positions, in operating statements, and in psychological reactions at the end of the "ten year period." Both school and industry representatives are presently evaluating these results. It is far too soon to make generalizations, yet some reactions stand out clearly.

For example, a 1929-type depression unexpectedly thrown at the teams produced quite different reactions. The company that fared best during the period exhibited what might be termed "cautious aggressiveness." They continued to invest in advertising and research, and adopted a moderate production policy. There were no drastic changes. Throughout the depression, their object seemed to be protection of cash position while maintaining a

conservative investment policy.

The company that fared badly, on the other hand, seemed to react emotionally to the sudden downturn in economic conditions. They took drastic action after spot decisions. They didn't have a plan of action nor any apparent long or short term investment program.

Another interesting development stemmed from the "president swapping" instituted by the faculty. Although the hypothetical companies did not elect officials or have any other delineated areas of responsibility, faculty members noted that in each team one man had assumed top or presidential responsibility while the rest fell into other specific slots.

Trends Continue

Realizing this trend, faculty supervisors decided to transfer out the presidents. At first, there was some confusion — and even resentment. Yet, almost immediately, one thing became evident; the teams faring well continued on their successful path while the teams doing poorly didn't improve as a result of the change.

Insight into this result was provided by a questionnaire filled at the end of the seminar. One question was: "How did the loss of your team 'president' affect your group?"

A member of the most successful company responded: "Our president was extremely capable. But we functioned by committee and the team's effectiveness was not unduly undermined by his loss." The story was quite different in the least successful group. Members stressed the "bossiness" of their president and some commented that they played little or no role in the decision making of the company.

A First for Rochester

The advanced management seminar, sponsored by the University's School of Business Administration, is the first in the Rochester community and one of the relatively few university sponsored courses designed to improve decision-making skills through simulation techniques.

Simulation as a tool to assist decision making and involving computer facilities first came into use

with the armed forces during World War II. Since then, a growing number of corporations, management associations, and universities have experimented with simulation programs.

"The greatest impetus," says Dr. John Brophy, Director of the School of Business Administration, "has come from the use of computers to simulate the business environment and compress years into minutes. Through the simple expedient of changing the program we can design courses which enable participants to grapple with a wide range of variables encountered in actual decision making."

The game is not perfect, Dr. Brophy stresses, and there is definite need for increased corollary teaching both before and after the simulation exercise. "The technique is just a few years old and we're still in the pioneering stage. Yet there is no doubt that it is a worthwhile tool in the higher education of business men — a tool that we intend to develop and refine as the more potent computing equipment becomes available to us."

Use the handy Readers Service Card between pages 40-41 for an easy way to get information on the latest developments in the systems field.

As far as the participants were concerned, their comments ranged from "good" to "outstanding". One plant manager commented, "It was the first insight I'd had into the coordination necessary for a top management decision. Although I may never be called on to come up with actions of such far-reaching importance, my own understanding of business is improved by the experience."

In the final analysis, it is rarely feasible to use an actual company for experiments in decision making. With a computer as a tool and classroom instruction to back it up, however, a lifetime of experience can be gained in weeks. The game of "executive musical chairs" might not have a counterpart in the actual world of business — but it can provide a valuable lesson in a university classroom.

micro-topics

continued from page 13

agencies, it so recommends. Since ASA is a member of the International Organization for Standardization, it cooperated in the production on international and multilingual glossaries. Under consideration at the present time is a *Vocabulary of Microcopy, Microfilm Techniques* which includes terms in German, French and English in parallel columns. When completed, this glossary will be available from the ISO and through the ASA.

ALA Contacts NMA

Librarians deal with words as well as ideas. They have to know what a word means in order to find the ideas behind the word. At their annual meeting in Cleveland in July, the members of the Copying Methods Section of the American Library Association "discussed the completion of a *Glossary of Standard Copying Methods Terminology* and proposed writing to the National Microfilm Association concerning the need and possible work already being done." This double approach to the problem should result in useful deliberation if not actual production.

In closing, I should like to note a very short but useful collection of some 45 terms used frequently by experts in the field to be found under the title: "Microrecording at Work" in *Industrial Photography* 10:69, 79, June 1961. □

management

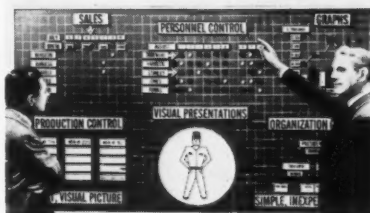
continued from page 10

the 'exception principle.' " *Introduction to Business Policy*, R. N. Owens (p. 8), Richard D. Irwin, Inc. (1954).

The gist of this principle is that only significant variations or deviations from the established standards or objectives should be referred to higher management for necessary action.

Reporting by exception (or exception reporting) is the means of implementing the exception principle. It consists of providing each successive level of responsibility with information pertaining to the variations and deviations. Such information should include an adequate explanation and interpretation of the variations, as well as an exposition of corrective action which has been or will be taken by the reporting unit, or specific recommendations for necessary action which should be taken by the recipient of the report. □

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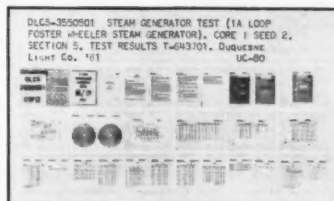
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"That's what you get for telling Hepplewhite his brains were in his feet."

new products

continued from page 8

Compact Electric Calculator 111

A 10-key electric calculator which weighs only 7 pounds and is smaller than a telephone has been introduced by the *Bohn Duplicator Company*. The Bohn Contex-20 machine adds, subtracts, multiplies either left or right, has automatic decimal indication in division, totals to 11 columns and holds a constant. Large easily-read function and numeral keys make operation easy at speeds up to 360 cycles per minute. Price \$235.

Color Microfilm 112

While the vast majority of microfilming is being done on black-and-white fine grain stocks, there has been an increasing demand for certain types of copy to be reproduced in color. *Dynacolor Corp.* has introduced their color microfilm to meet this need. The film is available in unperforated rolls of 100' x 35mm and is supplied with processing included in the purchase price. The processed film is returned to the customer in continuous roll form from plants located at various strategic points throughout the country. Tungsten exposure index

for the film is 16 and where the most accurate color reproduction is essential a CC-10-M, CC-20-M, or CC-30-M filter is recommended. Price is said to be a little over 2 times that of black-and-white films.

High Speed Printer 113

Anelex Corp. has available a complete computer print station which provides high speed printing at normal rates of 667 and 1000 lines per minute with virtually error free operation and negligible down time. The Anelex series 56-160 Printer used in the print station will handle forms from 4 to 20 inches wide and any length up to 22 inches. 122 columns of characters and 47 character per column are provided. These may be digital, digital and signs, or full alphanumeric symbols. Single or multiple carbons can also be made. No technical personnel are required for operation and maintenance can be performed by men who service general office equipment. The complete station is designed to operate with any IBM 700 series computer as well as other systems.

Selective Card File 114

A data storage system designed for those firms too small to justify the use of electronic data processing equipment

is being distributed in the United States by *Practa Data-Card System*. The system consists of cards folded once and furnished with cutouts along the folded edge. Small signals with holes which are available in fourteen different colors are inserted in the cut-outs. The signals can be moved or changed when the information on the cards is brought up to date. Data retrieval may be done visually by color or a sorting needle can be used for speed. Up to 34 signal positions and a variety of colors make the system extremely flexible. Frames are available to accommodate 200, 400, or 600 cards and a selector frame can also be placed on top of the regular card frame to enable separation of the cards and replacement without time-consuming manual filing. Three sizes of cards are available.

Computer Accessories 115

A wide variety of cabinets, inquiry station tables and pedestal units have been designed to exactly match the style of existing computer units by *System Sales Company*. The new High-Style line of accessories features chromed steel tubular legs, wide over-lay formica top finished in matching decorator colors and a wide variety of sizes.

Control Board 116

A quick changing visual control board that employs a magnetic steel board and magnetic symbols is available from *Methods Research Corporation*. The firm's Magnetic Control Board measures 24" x 36" and is finished in office grey and framed in polished aluminum. Various indicators in a variety of shapes and colors are also available. Price: \$24.50.

Computer Readout 117

A long standing need for a high precision economic digital computer visual monitor is said to be satisfied with the introduction by *General Dynamics/Electronics* of the S-C 1090 direct view display console. In operation the console displays sharp legible characters, symbols and vectors on a 19-inch Character Shaped Beam Tube. Up to 1,000 characters can be displayed on the tube face in a bright, non-flickering presentation. In addition to constant monitoring of digital computer outputs the S-C 1090 can display a significant block of information in computer storage and a quick search of the complete stored program makes possible more rapid debugging of new programs without resorting to mechanical printing of information.

Collating Equipment 118

A line of ten new floor model collators has been announced by *Thomas Collators, Inc.* with 8, 10, 16, 20 and 32 sheet capacities. Features include increased versatility, speedier set-up time, easier accessibility to working mechanisms. These will be available in two-tone finish.

NB READER-FILLER "600"



VIEW AND AUTOMATICALLY FILE MICROFILM INTO NOTCHED JACKETS

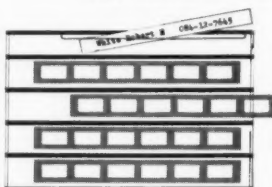
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Push button knife cuts exactly where you see it • Automatically aligns jacket chambers • Cleans film as it is inserted • Avoids fingerprints and film damage • Accommodates 100' rolls of 16 or 35mm film • Designed for

NB NOTCHED JACKETS



The jacket designed for the Reader-Filler with the "Easy Insert Index"

Flat for reading ease and reproduction quality • Notched for rapid film insertion (Manually or with Reader-Filler) • "Easy Insert Index" facilitates indexing and color code systems • Notched at both ends • Made from Eastman Kodak transparent triacitate • Exclusive bonding eliminates warping, buckling • Available in all standard card sizes

NB JACKETS CORP.

31-31 31st Street Long Island City 6, N.Y.

Circle No. 526 on Post Card

Wire Remover

119

A dewiring tool designed to remove fixed self contact wires from all makes of control panels has been introduced by **Randazzo Products**. The D-Y-R which removes 20 wires at one time is precision machined from polished airplane bar aluminum and has no moving parts to break or jam. The tool is simply placed on the wires and with a push or tap of the hand they are released and pushed part way through the panel. The tool is then reversed and used to remove the wires the rest of the way. Price: \$4.95.

Medium Speed Microfilm

120

Dynacolor Type 11 Microfilm is now available for use where highest resolution is required and is in the same speed class as conventional 35mm planetary camera microfilms. It is also intended for use in rotary cameras which are operated in higher reduction ratios and which have sufficient exposing light for medium speed films. The emulsion of the Dynacolor film is hardened to withstand high temperature machine processing and, in addition, is overcoated with a thin tough layer to reduce abrasion damage. The resolving power of Dynacolor Type 11 Microfilm is also said to compare favorably with competitive films.

Photo Electric Checker

121

The Univac Photoelectric Key Verifier has been added to the line of tabulating equipment being offered by **Remington Rand, Univac Div. of Sperry Rand Corp.** The unit includes adjustable right and left margin stops and an over-capacity verification key to check zero over-capacity punching. Each card during verification is in full view of the operator and when an error is found, the keyboard immediately locks at the column in which the difference occurs and an error light flashes on.

Big Screen Viewer

122

Large screen viewing of tab-size aperture cards in card holders or standard roll film is available from **Microdealers, Inc.** Designated the Draftsman Model 708-D, it features a 300 watt, blower-cooled projector with a magnification of 15X and an 18" x 24" screen in a steel cabinet with attractive baked enamel finish. The 708-D is said to be particularly useful for viewing newspapers, engineering drawings or other detailed material.

Memory File

123

More economical access to large volumes of information is said to be provided by the Card Random Access Memory (CRAM) device for use with the NCR315 electronic data processing system. The device manufactured by the **National Cash Register Company** employs a removable cartridge containing 256 magnetic cards on which information can be stored in any order and

selected and read when required in a sixth of a second. Up to 16 CRAM units can be operated in a 315 computer system and the card cartridges are interchangeable between CRAM units. Price: \$38,000.

Microfilm Card Reader

124

A 14X table model 35mm Microfilm Card Reader designed for use in brightly lighted rooms has been introduced by **Eugene Dietzgen Co.** The model 4305 Filmcard Reader projects its image onto a 10½" x 12" plastic screen which is shielded from overhead lights. A single control for movement of the film image in all directions and a scanning device for rapid viewing of selected film image areas is also featured. Film is protected by a glass film gate carrier which does not interfere with focus. Operation of the unit is from standard 115 volt 60 cycle, ½ amp. A.C. Current.

Card File

125

Dolin Metal Products, Inc. is now offering tab card box files capable of holding 12 units. Capacity of each storage unit is 12 tab card boxes with a total capacity of 24,000 cards. When larger capacities are required TAB-STOR units may be interlocked. Four caster bases are also available for easy mobility. Constructed of 22 gauge steel throughout the files are reinforced with a triple bend shoulder front and are finished in gray baked enamel.

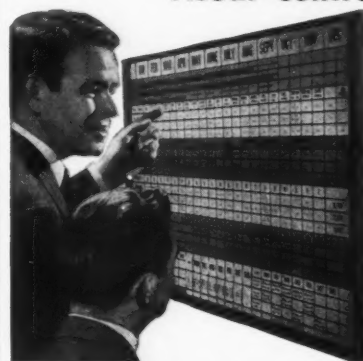
Collator Attachment

126

A unique collating interleaver for use with the Rex-Rotary D-490 twin-cylinder mimeograph has been announced by **Rex-Rotary Distributing Corp.** As the duplicator prints the second sheet or enclosure, the interleaver collates with it a copy of the previously printed sheet. The D-490 interleaver can also be used for slip-sheeting at faster rates than that from bulky die-cut cardboard layers.

continued on next page

You Get Things Done With Boardmaster Visual Control



- ☆ Gives Graphic Picture of Your Operations—Spotlighted by Color
- ☆ Facts at a glance — Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate — Type or Write on Cards, Snap in Grooves
- ☆ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ☆ Made of Metal. Compact and Attractive. Over 500,000 in Use

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GRAPHIC SYSTEMS

Yanceyville, North Carolina
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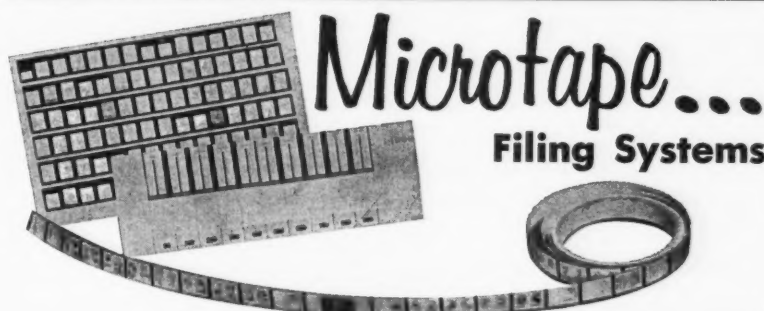
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Programming the
IBM 1401**

Write for free catalogue describing
our Business Computer Courses

Business Electronics Inc.

Computer Branch
420 Market St.
San Francisco 11, Cal.

Circle No. 504 on Post Card



MICROTAPE is designed for business records (systems applications) or single copy or minimum copy uses. It consists of 100' rolls of 16MM or 35MM positive microtext printed from negative rolls having a pressure sensitive adhesive laminated on the back side. These rolls are then cut into proper units and applied to an ordinary index card.

MICROTAPE SYSTEMS

44 LAURA STREET NEW HAVEN, CONN.

Circle No. 517 on Post Card

A VITAL SERVICE

for the Microphotographic Industry

The National Microfilm Association was organized in 1943 and subsequently incorporated in the State of Michigan as a non-profit Corporation. Its purposes are to advance the interests of the micro-reproduction industry by providing a channel of communication for producers of equipment and supplies, service companies and for users whether individuals or companies. Through its educational program, the Association has worked to stabilize and improve technical production and use of microphotography, and to keep producers and users alike fully abreast of latest developments. Membership in the Association is open to all corporate groups and individuals interested in the general field. Inquiries should be directed to:

Executive Secretary

NATIONAL MICROFILM ASSOCIATION

P. O. Box 386
Annapolis, Maryland



Tear off and mail



NATIONAL MICROFILM ASSOCIATION

P. O. Box 386
Annapolis, Md.

Gentlemen:

Please send, without obligation to me, complete information about your association.
I would also like to receive a FREE copy of the N. M. A. Handbook.

Company Name

Your name and title

Address

City and State

new products

continued from page 45

Tape Translator

127

Electronic converters that automatically translate records on magnetic tape from IBM and Univac language into Honeywell language have been developed by Minneapolis-Honeywell Regulator Co. The translations proceed at whatever speed the non-Honeywell tapes read the recorded data. The converted signals are then passed through a standard Honeywell tape control unit into the central processor of a Honeywell 800.

Workload Meter

128

Engler Instrument Company has introduced a combination Hour Meter and High Speed Counter for use on most IBM equipment. The instrument will register an accurate record of production time as well as counting the cards processed and eliminating certain manual records. A complete record of work load and machine performance for future study is also provided by the recorder.

Microfilm Reader

130

A reader with greater range of magnification than ever before possible is being marketed by General Precision, Inc. Utilizing closed-circuit television, the GPL Microfilm Televisor accepts a microfilm aperture card and transmits this image to a TV screen. A single aircraft-type stick control is used to move any part of the picture to the center screen position and magnification can be changed continuously through the entire range without loss of focus. Various other functions can be performed with auxiliary equipment for automatic loading and automatic search, retrieval and inserting.

Switch Panel

131

John W. Nelson, Inc. has introduced a collar switch panel for use on IBM types 077, 085, 087 and 089. The panel containing 18 switches is capable of performing forty-five different machine operations. The only requirements said to be necessary for its use are to wire the card columns, set the switches and push the start button.

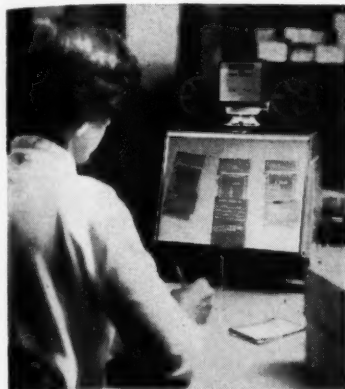
Schedule Board

134

A complete unit for visual control which features simplicity and flexibility is now available from Memo-Flex. The schedule board allows the user to make his own custom layout using pressure sensitive tape and letters, to create column rule lines and column title headings. Entries or notations are made directly on plastic snap-in strips with a grease pencil and can easily be erased with cloth or tissue.

contra costa

continued from page 18



slipped back in the book. The ID card is returned to the patron and the transaction completed in a matter of seconds with no writing to be done, no date stamping, no transaction card left to be filed. When a

book is returned, the clerk removes the transaction card, drops it through a slot in the desk, checks to be sure the book card is still in its envelope, and the book is ready for immediate re-shelving. With the manual system, book cards were filed and had to be replaced when a book was returned thus delaying the shelving procedure.

Simplifies Handling

Handling of overdue notices also has been greatly simplified by this system. The punched transaction cards from the returned books are collected daily and delivered to Central Circulation where they are sorted numerically and checked for due dates.

When a clerk finds a number missing, the processed film is put in one of the readers and the information needed for an overdue notice is obtained.

By eliminating the job of a clerk who slipped book cards from the file into returned books, one microfilmer in a branch with 100,000 circulation saves the library a net \$2,000 annually. These savings mount even faster in locations with larger circulations, since the microfilmer costs remain almost static except for films and incidentals.

It is estimated that in a location with 200,000 circulation, the savings in personnel costs will be about \$6,000 a year. In other words, each microfilmer will save \$2,000 on the first 100,000 of annual circulation in that location.

Librarians are pleased because the units take up little room on the control desks and are easy to operate. A clerk can answer questions or converse with a patron and charge out books at the same time, making for faster service and pleasanter relations with the public. □

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NEWSMAKERS

MIRT-NYU AFFILIATE

The intent group seated around the table on this month's cover is the Management Information Round Table's Executive Committee. The occasion of the gathering was to finalize plans for the affiliation of MIRT with New York University's Management Institute.

Announced by Dr. Dennis Phillips, director of the Institute, the affiliation will enable MIRT to furnish a broad range of specialized courses, workshop seminars and advanced programs for senior executives, middle managers and management technicians who typify MIRT membership. Effective immediately, MIRT's monthly luncheon-meetings will be conducted at NYU and open to qualified management personnel.

Plans for the monthly October-June programs include two symposiums at which business and industry leaders will be invited to speak.

Don Titus of the American Cyanamid Company will speak at the opening meeting on October 19. His subject will be "Management by Exception." Other subjects to be explored during the 1961-1962 meetings are:

Current Concepts and Practices in Information and Storage Retrieval;

Information Requirements in Engineering;

Information Problems in the Heavy Construction Industry;

Scan-O-Graph, a New Management Information Tool;

Better Reporting Systems;

The Veterans Administration's New Management Information System.

Organized in 1960, the MIRT is a membership organization composed of executives and management specialists primarily concerned with information systems and their applications, including data processing systems.

Two primary objectives of MIRT

are: to exchange ideas and information about techniques and experience in MIS, and to advance concepts and techniques for the design of MIS.

The Executive Committee members on the cover are, clockwise: Milton Reitzfeld, Program Chairman, Dept. of the Navy; William B. Warren, N. Y. Port Authority; Morton M. Raymond, Diebold, Inc.; Robert A. Schiff, NAREMCO Services; Dr. Herman Limberg, *Chairman*, Office of the City Administrator, NYC; and Prof. Joseph G. Woods, NYU Management Institute. John J. Whalen, Singer Sewing Machine Co., not in photo, is also a member.

Don Titus

Don Titus, speaker at MIRT's opening meeting on October 19, has specialized in the study of management reports for several years. He is currently with American Cyanamid handling special projects for the Administrative Standards Department.

A member of the Systems and Procedures Association, he has



served as Chapter President and National Director.

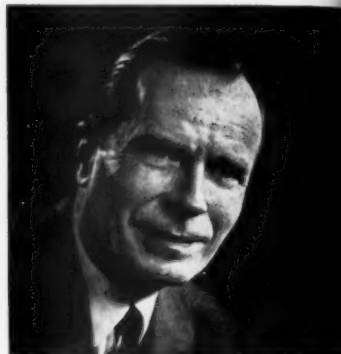
Titus' past associations have included positions with the Commis-

sion on Fiscal Affairs for New York State, the Research Institute of America, the U. S. Trust Co., and Standard Oil Company.

He has written numerous articles on the systems field.

Ray R. Eppert

A man who has been frequently spotlighted in the nation's leading business publications, Ray Eppert, president of the Burroughs Corp., continues to make his company a



news name. His latest advance has been to bring Burroughs, previously specializing in the manufacture of large-scale computer systems — though originally limited to business machines — into the mass punched card electronic computer business. In doing this, newsmaker Eppert made the calculation that the world market for automatic data processing equipment is growing at a faster rate than the rest of the entire business machine industry. He also declared that the market for automatic business data processing machines in the U.S. will approximately quadruple by 1970 from 1960's \$1 billion figure. Eppert looks for lower priced equipment (i.e. the punched card area) to make up the lion's share of this growth. Burroughs will be delighted if he proves to be a soothsayer as well as a newsmaker.

Eppert began with Burroughs in 1921 as a clerk, rising through Sales to the presidency in 1958.

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